STIC Search Report
EIC 1700

USPTO

STIC Database Tracking Number: 145037

TO: Stephen Stein
Location: REM 5D75
Art Unit : 1775
February 16, 2005

Case Serial Number: 10/629519

From: Les Henderson
Location: EIC 1700
REM 4B28 / 4A30
Phone: 571-272-2538

Leslie.henderson@uspto.gov

Search Notes

sira
Search and Information Resources Administration

STIC Search Results Feedback Form

USPTO

EIC17000

Questions about the scope or the results of the search? Contact ***the EIC searcher or contact*:**

Kathleen Fuller, EIC 1700 Team Leader
571/272-2505 REMSEN 4B28

Voluntary Results Feedback Form

- *I am an examiner in Workgroup:* ☐ *Example: 1713*
- *Relevant prior art* ***found****, search results used as follows:*

  ☐ 102 rejection

  ☐ 103 rejection

  ☐ Cited as being of interest.

  ☐ Helped examiner better understand the invention.

  ☐ Helped examiner better understand the state of the art in their technology.

  Types of relevant prior art found:

  ☐ Foreign Patent(s)

  ☐ Non-Patent Literature
  (journal articles, conference proceedings, new product announcements etc.)

- *Relevant prior art* ***not found:***

  ☐ Results verified the lack of relevant prior art (helped determine patentability).

  ☐ Results were not useful in determining patentability or understanding the invention.

Comments:

Drop off or send completed forms to EIC1700 REMSEN 4B28

Access DB# 145037

SEARCH REQUEST FORM

Scientific and Technical Information Center

Requester's Full Name: Stephen Stein Examiner # : 76049 Date: ____________
Art Unit: 1775 Phone Number 30____________ Serial Number: 10/629,519
Mail Box and Bldg/Room Location: ____________ Results Format Preferred (circle): PAPER DISK E-MAIL

If more than one search is submitted, please prioritize searches in order of need.

****

Please provide a detailed statement of the search topic, and describe as specifically as possible the subject matter to be searched. Include the elected species or structures, keywords, synonyms, acronyms, and registry numbers, and combine with the concept or utility of the invention. Define any terms that may have a special meaning. Give examples or relevant citations, authors, etc, if known. Please attach a copy of the cover sheet, pertinent claims, and abstract.

Title of Invention: $KYb(WO_4)_2$ Single Crystal

Inventors (please provide full names): ____________________________

Earliest Priority Filing Date: ____________________________

****For Sequence Searches Only* Please include all pertinent information (parent, child, divisional, or issued patent numbers) along with the appropriate serial number.*

****

STAFF USE ONLY		Type of Search		Vendors and cost where applicable	
Searcher:	XH	NA Sequence (#)		STN	$ 755.06
Searcher Phone #:		AA Sequence (#)		Dialog	
Searcher Location:		Structure (#)		Questel/Orbit	
Date Searcher Picked Up:		Bibliographic	✓	Dr.Link	
Date Completed:	2/16/05	Litigation		Lexis/Nexis	
Searcher Prep & Review Time:	10	Fulltext		Sequence Systems	
Clerical Prep Time:	30	Patent Family		WWW/Internet	
Online Time:	110	Other		Other (specify)	

PTO-1590 (8-01)

Suggs, Faye (ASRC)

From: Unknown@Unknown.com
Sent: Monday, February 14, 2005 9:27 AM
To: STIC-EIC1700
Subject: Generic form response

ResponseHeader=Commercial Database Search Request

AccessDB#= 145037

LogNumber=

Searcher=

SearcherPhone=

SearcherBranch=

MyDate=Mon Feb 14 09:26:05 EST 2005

submitto=STIC-EIC1700@uspto.gov

Name=Stephen Stein

Empno=76049

Phone=571-272-1544

Artunit=1775

Office=5D75

Serialnum=10/629,519

PatClass=423/594.15, 606, 641 117/ 944

Earliest=Jan 31, 2001

Format1=paper

Searchtopic=Requesting Literature Search for

A single crystal potassium ytterbium double wolframate

or

KYb(WO.sub.4)sub.2 $KYb(WO_4)_2$

Search is for US Serial Number 10/629,519 which is a continuation of PCT/ES02/00035 which claims priority to SPAIN P200100219 filed Jan 31, 2001.

Comments=May Contact me anytime

Office: 571-272-1544

send=SEND

```
=> d his ful

     (FILE 'HOME' ENTERED AT 14:11:29 ON 16 FEB 2005)

     FILE 'HCA' ENTERED AT 14:12:09 ON 16 FEB 2005
                E US20040055525/PN
L1            1 SEA ABB=ON  PLU=ON  US20040055525/PN
                D SCAN
                D ALL
                SET SMA OFF
                SEL RAN.HCA(3) L1 1
                SET SMA LOGIN
L2            1 SEA ABB=ON  PLU=ON  "132:100594"/AN
                D L2 BIB,ABS
                D SCAN
                SEL L1 RN

     FILE 'REGISTRY' ENTERED AT 14:16:58 ON 16 FEB 2005
L3            6 SEA ABB=ON  PLU=ON  (1314-35-8/BI OR 1314-37-0/BI OR
                18472-30-5/BI OR 22723-73-5/BI OR 584-08-7/BI OR
                7440-52-0/BI)
                D SCAN
                D L3 1-6 RN STR
                E 22723-73-5/RN
L4            1 SEA ABB=ON  PLU=ON  22723-73-5/RN
                D SCAN

     FILE 'HCA' ENTERED AT 14:22:55 ON 16 FEB 2005
L5           36 SEA ABB=ON  PLU=ON  L4
                D SCAN
L6            2 SEA ABB=ON  PLU=ON  L4/P
                D SCAN
L7         9767 SEA ABB=ON  PLU=ON  SINGLE(A)(CRYTAL? OR CRYST)
L8            0 SEA ABB=ON  PLU=ON  L7 AND L5
L9            5 SEA ABB=ON  PLU=ON  L5 AND (CRYTAL? OR CRYST)
                D SCAN
L10          74 SEA ABB=ON  PLU=ON  (POTASSIUM OR K)(2A)(YTTERBIUM? OR
                YB)(2A)(TUNGSTAT? OR WO4 OR (DOUBLE OR 2(W)WOLFRAMATE))
                OR KW2YBO8 OR KYB(W)WO4(W)2 OR KYB(W)WO.SUB.4(W)SUB.2
L11           6 SEA ABB=ON  PLU=ON  L10 AND ((CRYTAL? OR CRYST) OR L7)
                D SCAN
L12          36 SEA ABB=ON  PLU=ON  L5 OR L6
L13          83 SEA ABB=ON  PLU=ON  L12 OR L10
L14           7 SEA ABB=ON  PLU=ON  L9 OR L11
L15           7 SEA ABB=ON  PLU=ON  L13 AND ((CRYTAL? OR CRYST) OR L7)
L16          76 SEA ABB=ON  PLU=ON  L13 NOT L15
L17           2 SEA ABB=ON  PLU=ON  L6 AND L16
L18           0 SEA ABB=ON  PLU=ON  L6 AND L15
                D L13 1-83
                D L13 1-83 TI
                D QUE L13
                D QUE L13
                D QUE L15
```

```
                  D QUE L16
                  D QUE L10
L19            3 SEA ABB=ON  PLU=ON  (POTASSIUM OR K)(W)(TUNGSTEN OR
                  W)(W)(YTTERBIUM? OR YB)(W)OXID?
L20           35 SEA ABB=ON  PLU=ON  (POTASSIUM OR K)(A)(YTTERBIUM? OR
                  YB)(A)(TUNGSTAT? OR WO4 OR (DOUBLE OR 2(W)WOLFRAMATE))
                  OR KW2YBO8 OR KYB(W)WO4(W)2 OR KYB(W)WO.SUB.4(W)SUB.2
L21           45 SEA ABB=ON  PLU=ON  L20 OR L19 OR L5
L22            5 SEA ABB=ON  PLU=ON  L21 AND ((CRYTAL? OR CRYST) OR L7)
L23           45 SEA ABB=ON  PLU=ON  L21 OR L6
L24           40 SEA ABB=ON  PLU=ON  L23 NOT L22
L25           67 SEA ABB=ON  PLU=ON  (POTASSIUM OR K)(2A)(YTTERBIUM? OR
                  YB)(2A)(TUNGSTAT? OR WO4 OR ((DOUBLE OR 2)(W)WOLFRAMATE))
                   OR KW2YBO8 OR KYB(W)WO4(W)2 OR KYB(W)WO.SUB.4(W)SUB.2
L26           67 SEA ABB=ON  PLU=ON  L25 OR L19
L27           32 SEA ABB=ON  PLU=ON  (POTASSIUM OR K)(A)(YTTERBIUM? OR
                  YB)(A)(TUNGSTAT? OR WO4 OR ((DOUBLE OR 2)(W)WOLFRAMATE))
                  OR KW2YBO8 OR KYB(W)WO4(W)2 OR KYB(W)WO.SUB.4(W)SUB.2
L28           76 SEA ABB=ON  PLU=ON  L26 OR L6 OR L5
L29           42 SEA ABB=ON  PLU=ON  L27 OR L19 OR L6 OR L5
L30            6 SEA ABB=ON  PLU=ON  L28 AND ((CRYTAL? OR CRYST) OR L7)
L31            5 SEA ABB=ON  PLU=ON  L29 AND ((CRYTAL? OR CRYST) OR L7)
L32           70 SEA ABB=ON  PLU=ON  L28 NOT L30
L33           37 SEA ABB=ON  PLU=ON  L29 NOT L31
                  D QUE L30
                  D QUE L32
                  D QUE L31
                  D QUE L33
L34       243245 SEA ABB=ON  PLU=ON  (SINGLE OR MONO)(A)(CRYSTAL? OR
                  CRYST)
L35           76 SEA ABB=ON  PLU=ON  L25 OR L19 OR L5 OR L6
L36           17 SEA ABB=ON  PLU=ON  L34 AND L35
                  D QUE L27
L37           11 SEA ABB=ON  PLU=ON  L29 AND L34
                  D SCAN L36
                  D SCAN L37
L38           59 SEA ABB=ON  PLU=ON  L35 NOT L36
L39           25 SEA ABB=ON  PLU=ON  L38 AND L5
L40           11 SEA ABB=ON  PLU=ON  L36 AND L5
L41           34 SEA ABB=ON  PLU=ON  L38 NOT L39
L42           34 SEA ABB=ON  PLU=ON  (L35 OR L29) NOT (L36 OR L39)

=> => d que l36
L4             1 SEA FILE=REGISTRY ABB=ON  PLU=ON  22723-73-5/RN
L5            36 SEA FILE=HCA ABB=ON  PLU=ON  L4
L6             2 SEA FILE=HCA ABB=ON  PLU=ON  L4/P
L19            3 SEA FILE=HCA ABB=ON  PLU=ON  (POTASSIUM OR K)(W)(TUNGSTEN
                   OR W)(W)(YTTERBIUM? OR YB)(W)OXID?
L25           67 SEA FILE=HCA ABB=ON  PLU=ON  (POTASSIUM OR K)(2A)(YTTERBI
                  UM? OR YB)(2A)(TUNGSTAT? OR WO4 OR ((DOUBLE OR 2)(W)WOLFR
                  AMATE)) OR KW2YBO8 OR KYB(W)WO4(W)2 OR KYB(W)WO.SUB.4(W)S
                  UB.2
L34       243245 SEA FILE=HCA ABB=ON  PLU=ON  (SINGLE OR MONO)(A)(CRYSTAL?
```

```
                OR CRYST)
L35          76 SEA FILE=HCA ABB=ON  PLU=ON  L25 OR L19 OR L5 OR L6
L36          17 SEA FILE=HCA ABB=ON  PLU=ON  L34 AND L35
```

=> d l36 1-17 cbib abs hitstr hitind

L36 ANSWER 1 OF 17 HCA COPYRIGHT 2005 ACS on STN

142:102286 Erbium spectroscopy and 1.5-μm emission in KGd(WO4)2:Er,Yb **single crystals.** Mateos, Xavier; Pujol, Maria Cinta; Gueell, Frank; Galan, Miguel; Sole, Rosa Maria; Gavalda, Josefina; Aguilo, Magdalena; Massons, Jaume; Diaz, Francesc (Fisica i Cristal lografia de Materials (FiCMA), Universitat Rovira i Virgili, Tarragona, 43005, Spain). IEEE Journal of Quantum Electronics, 40(6), 759-770 (English) 2004. CODEN: IEJQA7. ISSN: 0018-9197. Publisher: Institute of Electrical and Electronics Engineers.

AB Good-optical-quality KGd(WO4)2 **single crystals** doped with Er and Yb ions at several concns. of dopants were grown using top-seeded-solution growth slow-cooling. The spectroscopic characterization of this material related to the 1.5-μm IR emission of Er which is interesting for laser applications was performed. To do this, polarized optical absorption at room temperature (RT) and at low temperature (6 K) and luminescence studies of the emission and lifetime were performed. The 1.5-μm emission of Er was obtained after selective laser pump excitation of the Yb ion and energy transfer between the 2 ions. The maximum emission cross section for 1.5 μm was .apprx.2.56 + 10-20 cm2 for the polarization of light with the elec. field parallel to the Nm principal optical direction. This value was higher than for other Er-doped materials with application in solid-state lasers such as LiYF4:Er (YLF:Er), Y3Al5O12:Er (YAG:Er), YAlO3:Er, and Al2O3:Er.

CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 75

ST erbium polarized absorption luminescence **ytterbium** gadolinium **potassium tungstate** crystal

IT Energy transfer
(between erbium and **ytterbium** in gadolinium **potassium tungstate single crystals**)

IT IR luminescence
Polarized optical spectra
(of erbium-**ytterbium**-codoped gadolinium **potassium tungstate single crystals**)

IT Absorptivity
(polarized; of erbium-**ytterbium**-codoped gadolinium **potassium tungstate single crystals**)

IT 22723-67-7, Gadolinium potassium tungstate (GdK(WO4)2)
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process)

(IR luminescence and polarized optical absorption of erbium-ytterbium-codoped **single crystals** of)

IT 18923-27-8, Ytterbium(3+), properties
RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process); USES (Uses)
(IR luminescence and polarized optical absorption of gadolinium potassium tungstate **single crystals** codoped with erbium and)

IT 18472-30-5, Erbium(3+), properties
RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process); USES (Uses)
(IR luminescence and polarized optical absorption of gadolinium potassium tungstate **single crystals** codoped with ytterbium and)

L36 ANSWER 2 OF 17 HCA COPYRIGHT 2005 ACS on STN

140:430894 KGW:Yb, Er **single crystals** growth for eye-safe lasers. Majchrowski, Andrzej; Mierczyk, Zygmunt; Kopczynski, Krzysztof; Kwasny, Miroslaw; Michalski, Edward; Zmija, Jozef (Institute of Applied Physics, Military Univ. of Technology, Warsaw, Pol.). Proceedings of SPIE-The International Society for Optical Engineering, 5136(Crystalline Materials for Optoelectronics), 36-40 (English) 2003. CODEN: PSISDG. ISSN: 0277-786X. Publisher: SPIE-The International Society for Optical Engineering.

AB KGd(WO4)2 (KGW) **single crystals** doped with Yb3+, Er3+, and (Yb3+; Er3+) were grown using Top Seeded Solution Growth (TSSG) technique. Growth was carried out on oriented seeds from self-flux containing 20 mol% of KGW dissolved in K2W2O7. The spectral properties and laser characteristics of obtained **single crystals** were studied. Absorption spectra of Er3+ and Yb3+-doped KGW were measured in the spectral range 200 ÷ 5000 nm at room temperature Excitation and luminescence spectra were also recorded at room temperature with a JOBIN-YVON spectrofluorometer using a diode laser (POLAROID 4300, 980 nm, 1 W) as an excitation source. The measurements of the lifetime of the Er3+ and Yb3+ ions in the upper laser level of the samples were made by the direct method with pulse excitation. Studies of longitudinally pumped KGW:Yb,Er microlasers with various Yb3+ and Er3+ ions concentration, generating at 1.5 μm were carried out.

CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 75

ST **ytterbium** erbium doped **potassium** gadolinium **tungstate** laser; crystal growth oxide eye safety laser

IT Fluorescence decay
IR spectra
Luminescence
Solid state lasers
(KGW:Yb, Er **single crystals** growth for eye-safe lasers)

IT Rare earth metals, properties
RL: DEV (Device component use); MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(ions; KGW:Yb, Er **single crystals** growth for eye-safe lasers)
IT Crystal growth
(top seeded solution; KGW:Yb, Er **single crystals** growth for eye-safe lasers)
IT 7440-52-0, Erbium, properties 7440-64-4, Ytterbium, properties 18472-30-5, Erbium(3+), properties 18923-27-8, Ytterbium(3+), properties
RL: DEV (Device component use); MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(KGW doped with; KGW:Yb, Er **single crystals** growth for eye-safe lasers)
IT 584-08-7, Potassium carbonate 1314-35-8, Tungsten oxide, reactions 1314-37-0, Ytterbium oxide 12061-16-4, Erbium oxide 12064-62-9, Gadolinium oxide
RL: RCT (Reactant); RACT (Reactant or reagent)
(KGW:Yb, Er **single crystals** growth for eye-safe lasers)
IT 22723-67-7, Gadolinium potassium tungstate gdk(wo4)2
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(doped with rare earth ions; KGW:Yb, Er **single crystals** growth for eye-safe lasers)

L36 ANSWER 3 OF 17 HCA COPYRIGHT 2005 ACS on STN
139:107977 On spectroscopic properties of the **KYb(WO4)2**:Pr3+ crystal. Deren, P. J.; Bednarkiewicz, A.; Mahiou, R.; Strek, W. (Instytut Niskich Temperatur i Badan Strukturalnych, Polska Akademia Nauk, Wroclaw, 50950, Pol.). Molecular Physics, 101(7), 951-960 (English) 2003. CODEN: MOPHAM. ISSN: 0026-8976. Publisher: Taylor & Francis Ltd..
AB Spectroscopic properties of Pr3+ doped **KYb(WO4)2 single crystals** were studied. The crystal lattice parameters were determined Energy levels of Pr3+ in **KYb(WO4)2** were assigned. The absorption, emission, excitation, time-resolved emission and excitation spectra were measured at low (10 K) and at room temperature Decay times of the Pr emissions are nonexponential and unusually short. Site selection spectroscopy evidences several different Pr3+ sites. The Judd-Ofelt intensity model was used to analyze the exptl. data. The Ωλ parameters, branching ratio and elec. dipole transition probabilities were determined
IT **22723-73-5, Potassium ytterbium tungstate (KYb(WO4)2)**
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(doped with praseodymium; spectroscopic properties of **KYb(WO4)2**:Pr3+ crystal)
RN 22723-73-5 HCA
CN Potassium tungsten ytterbium oxide (KW2YbO8) (9CI) (CA INDEX NAME)

Component	Ratio	Component

		Registry Number
O	8	17778-80-2
Yb	1	7440-64-4
W	2	7440-33-7
K	1	7440-09-7

CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 75
ST spectroscopic property praseodymium doped **potassium ytterbium tungstate** crystal
IT Luminescence
(polarized; spectroscopic properties of **KYb(WO4)2**:Pr3+ crystal)
IT Photoexcitation
(spectra; spectroscopic properties of **KYb(WO4)2**:Pr3+ crystal)
IT Crystal structure
Electronic transition
Energy level
Oscillator strength
Radiative transition
Refractive index
(spectroscopic properties of **KYb(WO4)2**:Pr3+ crystal)
IT **22723-73-5, Potassium ytterbium tungstate** (**KYb(WO4)2**)
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(doped with praseodymium; spectroscopic properties of **KYb(WO4)2**:Pr3+ crystal)
IT 7440-10-0, Praseodymium, properties 22541-14-6, Praseodymium(3+), properties
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(**potassium ytterbium tungstate** doped with; spectroscopic properties of **KYb(WO4)2**:Pr3+ crystal)

L36 ANSWER 4 OF 17 HCA COPYRIGHT 2005 ACS on STN
138:345620 Sensitization of Er3+ emission at 1.5 μm by Yb3+ in **KYb(WO4)2 single crystals**. Mateos, X.; Pujol, M. C.; Guell, F.; Sole, R.; Gavalda, Jna.; Aguilo, M.; Diaz, F.; Massons, J. (Laboratori de Fisica i Cristal·lografia de Materials (FiCMA) and IEA, Universitat Rovira i Virgili, Tarragona, 43005, Spain). Physical Review B: Condensed Matter and Materials Physics, 66(21), 214104/1-214104/12 (English) 2002. CODEN: PRBMDO. ISSN: 0163-1829. Publisher: American Physical Society.
AB We present our recent achievements in the growth and spectroscopic characterization of **KYb(WO4)2** crystals doped with erbium ions (hereafter KYbW:Er). We grew **single crystals** of KYbW:Er at several erbium concns. with optimal crystalline quality by the top-seeded-solution growth (TSSG) slow-cooling

method. We carried out spectroscopic measurements related to the polarized optical absorption and optical emission at room temperature (RT) and low temperature (6 K). The splitting of the excited energy levels and the ground energy level of erbium in KYbW were determined, derived from the absorption and emission measurements at 6 K, resp. We determined the near IR, around 1.5 μm (6667 cm-1), emission channels from the emission spectrum, and used the reciprocity method to calculate a maximum emission cross section of 2.7+10-20 cm2 for the polarization parallel to the Nm principal optical direction for the 1.534 μm (6519 cm-1) IR emission. We measured the lifetime of the 2F5/2→2F7/2 transition of ytterbium and the 4I13/2→4I15/2 transition of erbium at RT for several erbium concns. Finally, we present the Judd-Ofelt calcns. for the KYbW:Er system.

IT **22723-73-5, Potassium ytterbium tungstate** (**KYb(WO4)2**)
RL: PRP (Properties)
(undoped and erbium-doped crystals; sensitization of Er3+ emission at 1.5 μm by Yb3+ in **KYb(WO4) 2 single crystals**)

RN 22723-73-5 HCA

CN Potassium tungsten ytterbium oxide (KW2YbO8) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	8	17778-80-2
Yb	1	7440-64-4
W	2	7440-33-7
K	1	7440-09-7

CC 73-4 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 75, 78

ST erbium doping **potassium ytterbium tungstate** crystal photoluminescence polarized absorption

IT Polarized optical spectra
(UV and visible absorption; sensitization of Er3+ emission at 1.5 μm by Yb3+ in **KYb(WO4)2 single crystals**)

IT Doping
(effect of doping concentration; sensitization of Er3+ emission at 1.5 μm by Yb3+ in **KYb(WO4)2 single crystals**)

IT Electronic transition
(energy; sensitization of Er3+ emission at 1.5 μm by Yb3+ in **KYb(WO4)2 single crystals**)

IT Energy transfer
(erbium-ytterbium; sensitization of Er3+ emission at 1.5 μm by Yb3+ in **KYb(WO4)2 single crystals**)

IT Energy level splitting

(excited state; sensitization of Er3+ emission at 1.5 μm by Yb3+ in **KYb(WO4)2 single crystals**)

IT Polarized IR spectra
(near-IR absorption; sensitization of Er3+ emission at 1.5 μm by Yb3+ in **KYb(WO4)2 single crystals**)

IT IR luminescence
(near-IR; sensitization of Er3+ emission at 1.5 μm by Yb3+ in **KYb(WO4)2 single crystals**)

IT Fluorescence decay
Optical anisotropy
(sensitization of Er3+ emission at 1.5 μm by Yb3+ in **KYb(WO4)2 single crystals**)

IT Excited state
(splitting, lifetime; sensitization of Er3+ emission at 1.5 μm by Yb3+ in **KYb(WO4)2 single crystals**)

IT Oscillator strength
(theor. vs. exptl.; sensitization of Er3+ emission at 1.5 μm by Yb3+ in **KYb(WO4)2 single crystals**)

IT Crystal growth
(top-seeded-solution; sensitization of Er3+ emission at 1.5 μm by Yb3+ in **KYb(WO4)2 single crystals**)

IT 517906-56-8
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process)
(crystal; sensitization of Er3+ emission at 1.5 μm by Yb3+ in **KYb(WO4)2 single crystals**)

IT 517906-57-9 517906-58-0
RL: PRP (Properties)
(crystal; sensitization of Er3+ emission at 1.5 μm by Yb3+ in **KYb(WO4)2 single crystals**)

IT 7440-52-0, Erbium, properties 18472-30-5, Erbium(3+), properties
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(**potassium ytterbium tungstate** doped with; sensitization of Er3+ emission at 1.5 μm by Yb3+ in **KYb(WO4)2 single crystals**)

IT **22723-73-5, Potassium ytterbium tungstate** (**KYb(WO4)2**)
RL: PRP (Properties)
(undoped and erbium-doped crystals; sensitization of Er3+ emission at 1.5 μm by Yb3+ in **KYb(WO4)2 single crystals**)

L36 ANSWER 5 OF 17 HCA

138:262179 Up-conversion luminescence of ytterbium and thulium codoped potassium yttrium double tungstate crystal. Cheng, Z. X.; Yi, X. J.; Han, J. R.; Chen, H. C.; Wang, X. L.; Liu, H. K.; Dou, S. X.; Song, F.; Guo, H. C. (The State Key Lab of crystal materials, Shandong University, Jinan, 250100, Peop. Rep. China). Crystal Research and Technology, 37(12), 1318-1324 (English) 2002. CODEN: CRTEDF. ISSN: 0232-1300. Publisher: Wiley-VCH Verlag GmbH & Co. KGaA.

AB Tm and Yb co-doped double tungstate Yb3+,Tm3+: NaY(WO4)2 **single crystals** were prepared by using RF-heating Czochralski (CZ) pulling method. Its polarized transmittance spectra were recorded at 290-2000 nm at room temperature The energy levels transitions were assigned to the corresponding absorption line. The up-conversion luminescences at 793 nm and 475 nm were measured when the sample were pumped by 972 nm LD and the energy transfer mechanism between Yb3+ and Tm3+ ions was analyzed.

CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

ST upconversion luminescence **ytterbium** thulium codoped **potassium** yttrium **tungstate** crystal

L36 ANSWER 6 OF 17 HCA COPYRIGHT 2005 ACS on STN

138:195114 Crystal growth and spectroscopic characterization of Tm3+-doped **KYb(WO4)2 single crystals.** Pujol, M. C.; Guell, F.; Mateos, X.; Gavalda, Jna.; Sole, R.; Massons, J.; Aguilo, M.; Diaz, F.; Boulon, G.; Brenier, A. (Universitat Rovira i Virgili, Laboratori de Fisica i Cristal·lografia de Materials (FiCMA) and IEA, Tarragona, 43005, Spain). Physical Review B: Condensed Matter and Materials Physics, 66(14), 144304/1-144304/8 (English) 2002. CODEN: PRBMDO. ISSN: 0163-1829. Publisher: American Physical Society.

AB In this paper we present the crystal growth and optical characterization of thulium-doped **KYb(WO4)2** (hereafter KYbW). We grew thulium-doped KYbW monoclinic **single crystals** with optimal crystalline quality by the top-seeded-solution-growth (TSSG) slow-cooling method. Thulium spectroscopy was characterized in this host. The Judd-Ofelt parameters determined were Ω2=0.14+10-20 cm2, Ω4=0.21+10-20 cm2, and Ω6=0.10+10-20 cm2. The room temperature lifetimes measured for KYbW:Tm 1% were τ(1G4)=60-70 μs, τ(3H4)=90 μs and τ(3F4)=200 μs. We calculated the emission cross section for several channels. There was an important blue emission after pumping resonantly to the stoichiometric ytterbium at 980 nm, and we studied the emission channels of thulium. The presence of thulium luminescence is proof of the large transfer of energy in this compound

IT **22723-73-5, Potassium ytterbium tungstate (KYb(WO4)2)**
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process)
(thulium-doped **single crystal;** crystal growth and spectroscopic characterization of thulium-doped **KYb(WO4)2 single crystals**)

RN 22723-73-5 HCA
CN Potassium tungsten ytterbium oxide (KW2YbO8) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	8	17778-80-2
Yb	1	7440-64-4
W	2	7440-33-7
K	1	7440-09-7

CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 75
ST thulium doped **potassium ytterbium tungstate** crystal growth absorption luminescence
IT Luminescence quenching
(concentration; of thulium-doped **KYb(WO4)2 single crystals**)
IT Crystal growth
(crystal size; of thulium-doped **KYb(WO4)2 single crystals**)
IT Doping
(effect of doping concentration; crystal growth and spectroscopic characterization of thulium-doped **KYb(WO4)2 single crystals**)
IT Luminescence
(laser-induced, optical; of thulium-doped **KYb(WO4)2 single crystals**)
IT Excited state
(lifetime; of thulium-doped **KYb(WO4)2 single crystals**)
IT Polarized IR spectra
(near-IR, temperature-dependent; of thulium-doped **KYb(WO4)2 single crystals**)
IT Energy transfer
(nonresonant, Tm-Yb; in thulium-doped **KYb(WO4)2 single crystals**)
IT Energy level
(of thulium ion; crystal growth and spectroscopic characterization of thulium-doped **KYb(WO4)2 single crystals**)
IT Crystal field splitting
Fluorescence decay
(of thulium-doped **KYb(WO4)2 single crystals**)
IT Radiative transition
(rate and lifetime; crystal growth and spectroscopic characterization of thulium-doped **KYb(WO4)2 single crystals**)
IT Polarized optical spectra
(temperature-dependent; of thulium-doped **KYb(WO4)2 single crystals**)

IT 499138-81-7 499138-82-8 499138-83-9
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process)
(crystal growth and spectroscopic characterization of thulium-doped **KYb(WO4)2 single crystals**)

IT 7440-30-4, Thulium, properties 22541-23-7, Thulium(3+), properties
RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process); USES (Uses)
(**potassium ytterbium tungstate single crystal** doped with; crystal growth and spectroscopic characterization of thulium-doped **KYb(WO4)2 single crystals**)

IT **22723-73-5, Potassium ytterbium tungstate** (**KYb(WO4)2**)
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process)
(thulium-doped **single crystal**; crystal growth and spectroscopic characterization of thulium-doped **KYb (WO4)2 single crystals**)

L36 ANSWER 7 OF 17 HCA COPYRIGHT 2005 ACS on STN

137:223517 Growth and spectral properties of Er3+/Yb3+-codoped KY(WO4)2 crystal. Han, Xiumei; Wang, Guofu; Tsuboi, Taiju (Fujian Institute of Research on the Structure of Matter, Chinese Academy of Sciences, State Key Laboratory of Structural Chemistry, Fuzhou, Fujian, 350002, Peop. Rep. China). Journal of Crystal Growth, 242(3-4), 412-420 (English) 2002. CODEN: JCRGAE. ISSN: 0022-0248. Publisher: Elsevier Science B.V..

AB **Single crystals** of Er3+/Yb3+-codoped KY(WO4)2 with a large dimension up to 30+23+15 mm3 and no inclusion have been grown from a mixed flux of K2WO4 and KF by the top seeded solution growth (TSSG) method. The distribution coeffs. of Er3+ and Yb3+ in KY(WO4)2 crystal are 0.94 and 0.8, resp. Five emission bands are observed at 550-560, 660-680, 850-870, 950-1050 and 1450-1600 nm regions by 266 nm laser pumping. Unlike the cases of the other Er3+/Yb3+-codoped crystals, no upconversion was observed by 976 nm laser pumping.

CC 73-4 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 75

ST erbium **ytterbium** codoped **potassium** yttrium **tungstate** crystal growth flux; absorption photoluminescence crystal growth erbium ytterbium energy transfer

IT 7440-52-0, Erbium, properties 7440-64-4, **Ytterbium**, properties 18472-30-5, Erbium(3+), properties 18923-27-8, **Ytterbium**(3+), properties
RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process); USES (Uses)
(**potassium** yttrium **tungstate** containing; growth and spectral properties of Er3+/Yb3+-codoped KY(WO4)2 crystal)

L36 ANSWER 8 OF 17 HCA COPYRIGHT 2005 ACS on STN
137:147567 Double, optionally doped, **potassium-ytterbium tungstate single crystal**, production method therefor, and applications.
Pujol Baiges, Maria Cinta; Sole Cartana, Rosa; Aguilo Diaz, Magdalena; Mateos Ferre, Xavier; Massons Bosch, Jaume (Fundacio Urv Universitat Rovira I Virgili, Spain; Diaz Gonzalez, Francesc). PCT Int. Appl. WO 2002061896 A1 20020808, 35 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE, NL, PT, SE, SN, TD, TG, TR. (Spanish). CODEN: PIXXD2. APPLICATION: WO 2002-ES35 20020128. PRIORITY: ES 2001-219 20010131.

AB **KYb(WO4)2** crystals, especially with C2/c symmetry, optionally doped with rare earths, are described which can be employed as active media in IR diode-pumped visible (e.g., green and blue) lasers. Methods for preparing the crystals are described which entail growth from a solution of suitable precursors.

IT **22723-73-5P, Potassium ytterbium tungstate** (**KYb(WO4)2**)
RL: CPS (Chemical process); DEV (Device component use); IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); PYP (Physical process); PREP (Preparation); PROC (Process); USES (Uses)
(**potassium ytterbium tungstate single crystals** and their production and use in visible lasers)

RN 22723-73-5 HCA
CN Potassium tungsten ytterbium oxide (KW2YbO8) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	8	17778-80-2
Yb	1	7440-64-4
W	2	7440-33-7
K	1	7440-09-7

IC ICM H01S003-16
ICS C09K011-17

CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 75

ST **potassium ytterbium tungstate** crystal prodn laser medium

IT Crystal growth
(**potassium ytterbium tungstate**

single crystals and their production and use in visible lasers)

IT Visible lasers
(solid-state; **potassium ytterbium tungstate single crystals** and their production and use in visible lasers)

IT Solid state lasers
(visible; **potassium ytterbium tungstate single crystals** and their production and use in visible lasers)

IT **22723-73-5P, Potassium ytterbium tungstate** (**KYb**(**WO4**)**2**)
RL: CPS (Chemical process); DEV (Device component use); IMF (Industrial manufacture); PEP (Physical, engineering or chemical process); PYP (Physical process); PREP (Preparation); PROC (Process); USES (Uses)
(**potassium ytterbium tungstate single crystals** and their production and use in visible lasers)

IT 7440-52-0, Erbium, uses 18472-30-5, Erbium +3, uses
RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)
(**potassium ytterbium tungstate single crystals** and their production and use in visible lasers)

IT 584-08-7, **Potassium** carbonate 1314-35-8, Tungsten oxide, reactions 1314-37-0, **Ytterbium** oxide
RL: RCT (Reactant); RACT (Reactant or reagent)
(**potassium ytterbium tungstate single crystals** and their production and use in visible lasers)

L36 ANSWER 9 OF 17 HCA COPYRIGHT 2005 ACS on STN
137:131435 Green luminescence of Er3+ in stoichiometric **KYb**(**WO4**)**2 single crystals**.
Mateos, X.; Guell, F.; Pujol, M. C.; Bursukova, M. A.; Sole, R.; Gavalda, Jna.; Aguilo, M.; Diaz, F.; Massons, J. (Laboratori de Fisica i Cristal·lografia de Materials (FiCMA) and IEA, Universitat Rovira i Virgili, Tarragona, 43005, Spain). Applied Physics Letters, 80(24), 4510-4512 (English) 2002. CODEN: APPLAB. ISSN: 0003-6951. Publisher: American Institute of Physics.

AB The authors grew good-optical-quality **KYb**(**WO4**)**2 single crystals** doped with Er ions by the top seeded solution growth slow cooling method. Optical absorption of Er was performed at room temperature (RT) and at 6 K Green photoluminescence of Er was achieved at RT and 6 K after selective excitation of Yb ions at 940 nm (10,638 cm-1). The splitting of all found excited energy levels and the ground energy level of Er in **KYb**(**WO4**)**2** is presented derived from the accurate absorption and emission measurements, resp. The lifetime of the Stokes and the anti-Stokes green emissions of Er were measured after excitation at 488 nm (20,490 cm-1) and 940 nm(10,638 cm-1), resp. The authors propose applying the up-conversion model

to the observed green emission.
IT **22723-73-5, Potassium ytterbium tungstate (KYb(WO4)2)**
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(doped with erbium; Green luminescence of Er3+ in stoichiometric **KYb(WO4)2 single crystals**)
RN 22723-73-5 HCA
CN Potassium tungsten ytterbium oxide (KW2YbO8) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	8	17778-80-2
Yb	1	7440-64-4
W	2	7440-33-7
K	1	7440-09-7

CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
IT Energy level splitting
Luminescence
Optical up-conversion
(Green luminescence of Er3+ in stoichiometric **KYb(WO4)2 single crystals**)
IT Excited state
(splitting of; Green luminescence of Er3+ in stoichiometric **KYb(WO4)2 single crystals**)
IT **22723-73-5, Potassium ytterbium tungstate (KYb(WO4)2)**
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(doped with erbium; Green luminescence of Er3+ in stoichiometric **KYb(WO4)2 single crystals**)
IT 7440-52-0, Erbium, properties 18472-30-5, Er(3+), properties
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(potassium yttrium tungstate doped with; Green luminescence of Er3+ in stoichiometric **KYb(WO4)2 single crystals**)

L36 ANSWER 10 OF 17 HCA COPYRIGHT 2005 ACS on STN
137:85509 Growth, optical characterization, and laser operation of a stoichiometric crystal **KYb(WO4)2**.
Pujol, M. C.; Bursukova, M. A.; Guell, F.; Mateos, X.; Sole, R.; Gavalda, Jna.; Aguilo, M.; Massons, J.; Diaz, F.; Klopp, P.; Griebner, U.; Petrov, V. (Grup de Fisica i Cristal.lografia (FiCMA), Universitat Rovira i Virgili, Tarragona, 43005, Spain). Physical Review B: Condensed Matter and Materials Physics, 65(16), 165121/1-165121/11 (English) 2002. CODEN: PRBMDO. ISSN: 0163-1829. Publisher: American Physical Society.
AB The authors present the authors' recent achievements in the growing and optical characterization of **KYb(WO4)**

2 (hereafter KYbW) crystals and demonstrate laser operation in this stoichiometric material. **Single crystals** of KYbW with optimal crystalline quality were grown by the top-seeded-solution growth slow-cooling method. The optical anisotropy of this monoclinic crystal was characterized, locating the tensor of the optical indicatrix and measuring the dispersion of the principal values of the refractive indexes as well as the thermo-optic coeffs. Sellmeier equations were constructed valid in the visible and near-IR spectral range. Raman scattering was used to determine the phonon energies of KYbW and a simple phys. model is applied for classification of the lattice vibration modes. Spectroscopic studies (absorption and emission measurements at room and low temperature) were carried out in the spectral region near 1 μm characteristic for the Yb transition. Energy positions of the Stark sublevels of the ground and the excited state manifolds were determined and the vibronic substructure was identified. The intrinsic lifetime of the upper laser level was measured taking care to suppress the effect of reabsorption and the intrinsic quantum efficiency was estimated. Lasing was demonstrated near 1074 nm with 41% slope efficiency at room temperature using a 0.5 mm thin plate of KYbW. This laser material holds great promise for diode pumped high-power lasers, thin disk and waveguide designs as well as for ultrashort (ps/fs) pulse laser systems.

IT **22723-73-5, Potassium ytterbium tungstate** (**KYb**(**WO4**)**2**)
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(growth, optical characterization, and laser operation of a stoichiometric crystal **KYb**(**WO4**)**2**)
RN 22723-73-5 HCA
CN Potassium tungsten ytterbium oxide (KW2YbO8) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	8	17778-80-2
Yb	1	7440-64-4
W	2	7440-33-7
K	1	7440-09-7

CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 75
ST growth optical property laser stoichiometric **potassium ytterbium tungstate**
IT Energy level
(Stark; growth, optical characterization, and laser operation of a stoichiometric crystal **KYb**(**WO4**)**2**)
IT Crystal growth
Crystal structure
Lasers
Luminescence
Optical anisotropy
Raman spectra

Thermooptical effect
Vibronic level
(growth, optical characterization, and laser operation of a stoichiometric crystal **KYb(WO4)2**)
IT Transparency
(optical window; growth, optical characterization, and laser operation of a stoichiometric crystal **KYb(WO4)2**)
IT **22723-73-5, Potassium ytterbium tungstate** (**KYb(WO4)2**)
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(growth, optical characterization, and laser operation of a stoichiometric crystal **KYb(WO4)2**)

L36 ANSWER 11 OF 17 HCA COPYRIGHT 2005 ACS on STN
136:392852 Structure, crystal growth and physical anisotropy of KYb(WO4)3, a new laser matrix. Pujol, M. C.; Mateos, X.; Sole, R.; Massons, J.; Gavalda, Jna.; Solans, X.; Diaz, F.; Aguilo, M. (Fisica i Cristallografia de Materials (FiCMA), Universitat Rovira i Virgili, Tarragona, 43005, Spain). Journal of Applied Crystallography, 35(1), 108-112 (English) 2002. CODEN: JACGAR. ISSN: 0021-8898. Publisher: Blackwell Munksgaard.
AB The crystal structure of monoclinic **KYb(WO4)2** (KYbW) crystals was refined (in space group C2/c) at room temperature by using **single-crystal** x-ray diffraction data. KYbW undoped crystals were grown by the TSSG (top-seeded-solution growth) slow-cooling method. The crystals show {110}, {111}, {010} and {310} faces, which basically define their habit. The linear thermal expansion tensor was determined and the principal axis with maximum thermal expansion ($\alpha'33$ = 16.68 + 10-6 K-1), X'3, was located 12° from the c axis. Its principal X'1, X'2 and X'3 axes are [302], [010] and [106] directions, resp., in the crystallog. system. The optical tensor was studied at λ = 632.8 nm at room temperature; two principal axes, Ng and Nm, are located in the ac plane, while the other, Np, is parallel to [010]. The principal axis with maximum refractive index (ng = 2.45), Ng, was located 19° from the c axis.
IT **22723-73-5, Potassium tungsten ytterbium oxide** (**KW2YbO8**)
RL: PRP (Properties)
(structure, crystal growth and phys. anisotropy of KYb(WO4)3, a new laser matrix)
RN 22723-73-5 HCA
CN Potassium tungsten ytterbium oxide (KW2YbO8) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	8	17778-80-2
Yb	1	7440-64-4
W	2	7440-33-7
K	1	7440-09-7

CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 75
ST structure crystal growth **potassium ytterbium tungstate**; phys anisotropy tungstate laser matrix
IT **22723-73-5, Potassium tungsten ytterbium oxide (KW2YbO8)**
RL: PRP (Properties)
(structure, crystal growth and phys. anisotropy of KYb(WO4)3, a new laser matrix)

L36 ANSWER 12 OF 17 HCA COPYRIGHT 2005 ACS on STN
135:279857 Yb sensitizing of Er3+ up-conversion emission in KGd(WO4)2:Er:Yb **single crystals.** Rico, M.; Pujol, M. C.; Mateos, X.; Massons, J.; Zaldo, C.; Aguilo, M.; Diaz, F. (Instituto de Ciencia de Materiales de Madrid, Consejo Superior de Investigaciones Cientificas, Madrid, 28049, Spain). Journal of Alloys and Compounds, 323-324, 362-366 (English) 2001. CODEN: JALCEU. ISSN: 0925-8388. Publisher: Elsevier Science S.A..
AB KGd(1-x-y)ErxYby(WO4)2 (x/y = 0.024/0, 0.02/0.022 and 0.019/0.066) **single crystals** have been grown by the top seeded solution growth slow cooling method using K2W2O7 as solvent. Er concentration was selected at [Er] = 1.2-1.5 + 1020 cm-3 to minimize Er-Er nonradiative losses and the Yb concentration was varied in the range [Yb] = 0-4.2 + 1020 cm-3. The optical absorption in the 850-1100 nm spectral range is characterized by the overlap between Yb 2F5/2 and Er 4I11/2 manifolds. At room temperature the green 4S3/2 Er3+ emission was excited by energy transfer from the 2F5/2 (934.2, 953.2 and 980.8 nm) Yb multiplet. The up-converted emission is weakly polarized and within the concentration range studied its intensity increases with the Yb3+ concentration
CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
ST gadolinium **potassium tungstate** erbium **ytterbium** crystal emission
IT Crystal growth
(Yb sensitizing of Er3+ up-conversion emission in KGd(WO4)2:Er:Yb **single crystals**)
IT 22723-67-7, Gadolinium potassium tungstate (GdK(WO4)2)
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
(erbium- and ytterbium-doped; Yb sensitizing of Er3+ up-conversion emission in KGd(WO4)2:Er:Yb **single crystals**)
IT 7440-52-0, Erbium, uses 7440-64-4, **Ytterbium**, uses
RL: MOA (Modifier or additive use); USES (Uses)
(gadolinium **potassium tungstate** doped with; Yb sensitizing of Er3+ up-conversion emission in KGd(WO4)2:Er:Yb **single crystals**)

L36 ANSWER 13 OF 17 HCA COPYRIGHT 2005 ACS on STN
135:83636 Growth by the top nucleated floating crystal method and

spectroscopic properties of Yb3+-doped KGd(WO4)2. Brenier, A.; Metrat, G.; Muhlstein, N.; Bourgeois, F.; Boulon, G. (Laboratoire de Physico-Chimie des Materiaux Luminescents, CNRS-UMR 5620,Universite Claude Bernard Lyon I, Villeurbanne, 69622, Fr.). Optical Materials (Amsterdam, Netherlands), 16(1/2), 189-192 (English) 2001. CODEN: OMATET. ISSN: 0925-3467. Publisher: Elsevier Science B.V..

AB KGd(WO4)2:Yb3+ **single crystal** was grown by the top nucleated floating crystal method. The spectroscopic characterization was performed (absorption and fluorescence) for the 2 orthogonal polarizations corresponding to the axis of the optical indicatrix for light propagation along the b-axis.

CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 75

ST **ytterbium** doped gadolinium **potassium tungstate** crystal growth spectra

IT Crystal growth
(by top nucleated floating crystal method of **ytterbium** -doped gadolinium **potassium tungstate**)

IT IR spectra
(near-IR; of **ytterbium**-doped gadolinium **potassium tungstate single crystal**)

IT Polarized fluorescence
(of **ytterbium**-doped gadolinium **potassium tungstate single crystal**)

L36 ANSWER 14 OF 17 HCA COPYRIGHT 2005 ACS on STN

129:282786 Effect of random distribution and molecular interactions on optical properties of Er3+ dopant in KY(WO4)2 and Ho3+ in **KYb(WO4)2**. Macalik, L.; Deren, P. J.; Hanuza, J.; Strek, W.; Demidovich, A. A.; Kuzmin, A. N. (Inst. Low Temperatures and Structure Res., Pol. Acad. Sci., Wroclaw, 50-950, Pol.). Journal of Molecular Structure, 450(1-3), 179-192 (English) 1998. CODEN: JMOSB4. ISSN: 0022-2860. Publisher: Elsevier Science B.V..

AB The spectroscopic properties of Er3+ doped KY(WO4)2 and Ho3+ doped **KYb(WO4)2 single crystals** are reported and related to their x-ray structures. The exptl. data include a survey of electronic absorption and emission features as well as vibrational IR and Raman spectra made in the polarized light. The effect of the random distribution of the monovalent and trivalent cations as well as intermol. interactions between the tungstate anions are discussed.

IT **22723-73-5, Potassium ytterbium tungstate** (**KYb(WO4)2**)
RL: PRP (Properties)
(effect of random distribution and mol. interactions on optical properties of erbium dopant in potassium yttrium tungstate [KY(WO4)2] and holmium in **potassium ytterbium tungstate** [**KYb(WO4)2**])

RN 22723-73-5 HCA

CN Potassium tungsten ytterbium oxide (KW2YbO8) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	8	17778-80-2
Yb	1	7440-64-4
W	2	7440-33-7
K	1	7440-09-7

CC 73-4 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

ST erbium potassium yttrium tungstate spectra disorder; holmium **potassium ytterbium tungstate** spectra disorder; potassium lanthanide tungstate spectra disorder interaction; IR potassium lanthanide tungstate disorder interaction; visible potassium lanthanide tungstate disorder interaction; UV potassium lanthanide tungstate disorder interaction; fluorescence potassium lanthanide tungstate disorder interaction; luminescence potassium lanthanide tungstate disorder interaction; Raman potassium lanthanide tungstate disorder interaction; vibration potassium lanthanide tungstate disorder interaction; Stark potassium lanthanide tungstate disorder interaction; phonon potassium lanthanide tungstate disorder interaction

IT Disorder
Energy level splitting
Fluorescence
Fluorescence decay
IR spectra
Luminescence
Molecular vibration
Phonon
Raman spectra
Stark effect
UV and visible spectra
Vibrational frequency
(effect of random distribution and mol. interactions on optical properties of erbium dopant in potassium yttrium tungstate [KY(WO4)2] and holmium in **potassium ytterbium tungstate** [**KYb(WO4)2**])

IT 7440-52-0, Erbium, properties 7440-60-0, Holmium, properties 18472-30-5, Erbium(3+), properties 22541-22-6, Holmium(3+), properties
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(effect of random distribution and mol. interactions on optical properties of erbium dopant in potassium yttrium tungstate [KY(WO4)2] and holmium in **potassium ytterbium tungstate** [**KYb(WO4)2**])

IT 20596-83-2, Potassium yttrium tungstate (KY(WO4)2)
22723-73-5, Potassium ytterbium tungstate (**KYb(WO4)2**)
RL: PRP (Properties)
(effect of random distribution and mol. interactions on optical properties of erbium dopant in potassium yttrium tungstate

[KY(WO4)2] and holmium in **potassium ytterbium tungstate** [**KYb(WO4)2**])

L36 ANSWER 15 OF 17 HCA COPYRIGHT 2005 ACS on STN
118:28862 **Single crystals** of tungsten compounds as promising materials for the total absorption detectors of the e.m. calorimeters. Baryshevskii, V. G.; Korzhik, M. V.; Moroz, V. I.; Pavlenko, V. B.; Lobko, A. S.; Fedorv, A. A.; Kachanov, V. A.; Solov'yanov, V. L.; Zadneprovskii, B. I.; et al. (Inst. Nucl. Probl., Minsk, 220050, Belarus). Nuclear Instruments & Methods in Physics Research, Section A: Accelerators, Spectrometers, Detectors, and Associated Equipment, A322(2), 231-4 (English) 1992. CODEN: NIMAER. ISSN: 0168-9002.

AB Some characteristics including radiation resistance of PbWO4, NaBi(WO4)2, and **KYb(WO4)2** crystals, which are promising for application in detectors at new accelerators and colliders, are described.

IT **22723-73-5, Potassium ytterbium tungstate** (**KYb(WO4)2**)
RL: PROC (Process)
(as candidate material for electromagnetic calorimetric detector, characterization of)

RN 22723-73-5 HCA
CN Potassium tungsten ytterbium oxide (KW2YbO8) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	8	17778-80-2
Yb	1	7440-64-4
W	2	7440-33-7
K	1	7440-09-7

CC 71-7 (Nuclear Technology)

IT 7759-01-5, Lead tungstate (PbWO4) 14692-27-4, Bismuth sodium tungstate (BiNa(WO4)2) **22723-73-5, Potassium ytterbium tungstate** (**KYb(WO4)**
2)
RL: PROC (Process)
(as candidate material for electromagnetic calorimetric detector, characterization of)

L36 ANSWER 16 OF 17 HCA COPYRIGHT 2005 ACS on STN
106:223313 Polarized infrared and Raman spectra of monoclinic potassium rare earth tungstates (α-KLn(WO4)2) **single crystals** (Ln = Sm-Lu, Y). Hanuza, J.; Macalik, L. (Inst. Low Temp. Struct. Res., Pol. Acad. Sci., Wroclaw, Pol.). Spectrochimica Acta, Part A: Molecular and Biomolecular Spectroscopy, 43A(3), 361-73 (English) 1987. CODEN: SAMCAS. ISSN: 0584-8539.

AB The polarized IR and Raman spectra for **single crystals** of α-KLn(WO4)2 family were measured, where Ln = Y and lanthanides from Sm to Lu. The mol. and crystal structures

were analyzed in terms of C 2/C = C62h(Z = 4) monoclinic unit cell. A comparison of vibrational spectra measured for isomorphic crystals of several rare earth elements was used to describe the internal and external optic modes. On the basis the hexacoordination of W atoms and polymeric (W2O10)n clusters with bridge systems are discussed.

IT **22723-73-5, Potassium ytterbium tungstate (KYb(WO4)2)**
RL: PRP (Properties)
(IR and Raman spectra of)

RN 22723-73-5 HCA

CN Potassium tungsten ytterbium oxide (KW2YbO8) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	8	17778-80-2
Yb	1	7440-64-4
W	2	7440-33-7
K	1	7440-09-7

CC 73-3 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 75

IT 15557-13-8, Europium potassium tungstate (EuK(WO4)2) 20596-82-1, Erbium potassium tungstate (ErK(WO4)2) 20596-83-2, Potassium yttrium tungstate (KY(WO4)2) 22723-44-0, Lutetium potassium tungstate (LuK(WO4)2) 22723-65-5, Potassium samarium tungstate (KSm(WO4)2) 22723-67-7, Gadolinium potassium tungstate (GdK(WO4)2) 22723-68-8, Potassium terbium tungstate (KTb(WO4)2) 22723-69-9 22723-70-2, Holmium potassium tungstate (HoK(WO4)2) 22723-72-4, Potassium thulium tungstate (KTm(WO4)2) **22723-73-5, Potassium ytterbium tungstate (KYb(WO4)2)**
RL: PRP (Properties)
(IR and Raman spectra of)

L36 ANSWER 17 OF 17 HCA

71:7470 Synthesis, x-ray, and thermographic study of potassium-rare earth element tungstates KLn(WO4)2[Ln=rare earth elements.
Klevtsov, P. V.; Kozeeva, L. P. (Inst. Neorg. Khim., Novosibirsk, USSR). Doklady Akademii Nauk SSSR, 185(3), 571-4 (Russian) 1969. CODEN: DANKAS. ISSN: 0002-3264.

AB **Single crystals** of KLn tungstates (Ln = La-Lu) were prepared by crystallization from a mixture of K2WO4, WO3, and Ln2(WO4)3 at 1000-1200°. Both x-ray and D.T.A. of the final products proved the existence of 2 crystalline structures: a tetragonal scheelite type structure in the La, Ce, Pr, and NdK tungstates, and a monoclinic KY(WO4)2 type structure in the rest of the synthetized tungstates.

IT **22723-73-5**
RL: PRP (Properties)
(crystal structure of)

RN 22723-73-5 HCA

```
CN   Potassium tungsten ytterbium oxide (KW2YbO8) (9CI)   (CA INDEX NAME)

  Component    |        Ratio         |     Component
               |                      |  Registry Number
==============+====================+===================
O              |          8           |       17778-80-2
Yb             |          1           |        7440-64-4
W              |          2           |        7440-33-7
K              |          1           |        7440-09-7

CC   70 (Crystallization and Crystal Structure)
IT   15557-13-8   20596-80-9   20596-82-1   22569-16-0   22569-17-1
     22723-44-0   22723-65-5   22723-67-7   22723-68-8   22723-69-9
     22723-70-2   22723-72-4 22723-73-5
     RL: PRP (Properties)
        (crystal structure of)


=> => d que l39
L4            1 SEA FILE=REGISTRY ABB=ON  PLU=ON  22723-73-5/RN
L5           36 SEA FILE=HCA ABB=ON  PLU=ON  L4
L6            2 SEA FILE=HCA ABB=ON  PLU=ON  L4/P
L19           3 SEA FILE=HCA ABB=ON  PLU=ON  (POTASSIUM OR K)(W)(TUNGSTEN
                 OR W)(W)(YTTERBIUM? OR YB)(W)OXID?
L25          67 SEA FILE=HCA ABB=ON  PLU=ON  (POTASSIUM OR K)(2A)(YTTERBI
                UM? OR YB)(2A)(TUNGSTAT? OR WO4 OR ((DOUBLE OR 2)(W)WOLFR
                AMATE)) OR KW2YBO8 OR KYB(W)WO4(W)2 OR KYB(W)WO.SUB.4(W)S
                UB.2
L34      243245 SEA FILE=HCA ABB=ON  PLU=ON  (SINGLE OR MONO)(A)(CRYSTAL?
                 OR CRYST)
L35          76 SEA FILE=HCA ABB=ON  PLU=ON  L25 OR L19 OR L5 OR L6
L36          17 SEA FILE=HCA ABB=ON  PLU=ON  L34 AND L35
L38          59 SEA FILE=HCA ABB=ON  PLU=ON  L35 NOT L36
L39          25 SEA FILE=HCA ABB=ON  PLU=ON  L38 AND L5


=> d l35 1-25 cbib abs hitstr hitind

L35  ANSWER 1 OF 76  HCA  COPYRIGHT 2005 ACS on STN
142:143430  KYb(WO4)2 provides the smallest
     laser quantum defect.  Klopp, P.; Griebner, U.; Petrov, V.
     (Max-Born-Institute for Nonlinear Optics and Ultrafast Spectroscopy,
     Berlin, D-12489, Germany).  Trends in Optics and Photonics,
     88(Conference on Lasers and Electro-Optics (CLEO), 2003),
     CWG3/1-CWG3/2 (English) 2003.  CODEN: TOPRBS.  Publisher: Optical
     Society of America.
AB   The smallest quantum defect (1.6%) for a laser crystal is
     demonstrated with a 125 µm-thin plate of stoichiometric
     KYb(WO4)2.  Pumped at 1025 nm, it
     emitted at 1042 nm.
IT   22723-73-5, Potassium ytterbium
     tungstate KYb(WO4)2
     RL: DEV (Device component use); PRP (Properties); USES (Uses)
```

(**KYb**(**WO4**)**2** provides the smallest
laser quantum defect)

RN 22723-73-5 HCA

CN Potassium tungsten ytterbium oxide (KW2YbO8) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	8	17778-80-2
Yb	1	7440-64-4
W	2	7440-33-7
K	1	7440-09-7

CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

ST laser quantum defect **potassium ytterbium tungstate**

IT IR luminescence
IR spectra
Lasers
Quantum defect
(**KYb**(**WO4**)**2** provides the smallest
laser quantum defect)

IT **22723-73-5, Potassium ytterbium tungstate KYb**(**WO4**)**2**
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(**KYb**(**WO4**)**2** provides the smallest
laser quantum defect)

L35 ANSWER 2 OF 76 HCA COPYRIGHT 2005 ACS on STN

142:102596 Growth, optical characterization, and laser operation of epitaxial Yb: KY(WO4)2 /KY(WO4)2 composites with monoclinic structure. Aznar, A.; Sole, R.; Aguilo, M.; Diaz, F.; Griebner, U.; Grunwald, R.; Petrov, V. (Grup de Fisica i Cristal lografia de Materials (FiCMA), Universitat Rovira i Virgili, Tarragona, 1, 43005, Spain). Applied Physics Letters, 85(19), 4313-4315 (English) 2004. CODEN: APPLAB. ISSN: 0003-6951. Publisher: American Institute of Physics.

AB Epitaxial monoclinic double tungstate laser crystals were grown with high crystalline quality. Based on these Yb-doped composites, laser operation was demonstrated. Continuous-wave laser emission of a Yb:KYW/KYW crystal was achieved at 1030 nm. The 25-μm-thin Yb:KYW layer was pumped at wavelengths near 980 nm by a Ti:sapphire laser. A maximum output power of 40 mW was obtained at room temperature

CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 75

ST **potassium ytterbium** yttrium **tungstate**
IR laser crystal

IT Crystal structure
(of **potassium ytterbium** yttrium
tungstate as laser crystal)

L35 ANSWER 3 OF 76 HCA COPYRIGHT 2005 ACS on STN
142:102286 Erbium spectroscopy and 1.5-μm emission in KGd(WO4)2:Er,Yb single crystals. Mateos, Xavier; Pujol, Maria Cinta; Gueell, Frank; Galan, Miguel; Sole, Rosa Maria; Gavalda, Josefina; Aguilo, Magdalena; Massons, Jaume; Diaz, Francesc (Fisica i Cristal lografia de Materials (FiCMA), Universitat Rovira i Virgili, Tarragona, 43005, Spain). IEEE Journal of Quantum Electronics, 40(6), 759-770 (English) 2004. CODEN: IEJQA7. ISSN: 0018-9197. Publisher: Institute of Electrical and Electronics Engineers.

AB Good-optical-quality KGd(WO4)2 single crystals doped with Er and Yb ions at several concns. of dopants were grown using top-seeded-solution growth slow-cooling. The spectroscopic characterization of this material related to the 1.5-μm IR emission of Er which is interesting for laser applications was performed. To do this, polarized optical absorption at room temperature (RT) and at low temperature (6 K) and luminescence studies of the emission and lifetime were performed. The 1.5-μm emission of Er was obtained after selective laser pump excitation of the Yb ion and energy transfer between the 2 ions. The maximum emission cross section for 1.5 μm was .apprx.2.56 + 10-20 cm2 for the polarization of light with the elec. field parallel to the Nm principal optical direction. This value was higher than for other Er-doped materials with application in solid-state lasers such as LiYF4:Er (YLF:Er), Y3Al5O12:Er (YAG:Er), YAlO3:Er, and Al2O3:Er.

CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 75

ST erbium polarized absorption luminescence **ytterbium** gadolinium **potassium tungstate** crystal

IT Energy transfer
(between erbium and **ytterbium** in gadolinium **potassium tungstate** single crystals)

IT IR luminescence
Polarized optical spectra
(of erbium-**ytterbium**-codoped gadolinium **potassium tungstate** single crystals)

IT Absorptivity
(polarized; of erbium-**ytterbium**-codoped gadolinium **potassium tungstate** single crystals)

L35 ANSWER 4 OF 76 HCA COPYRIGHT 2005 ACS on STN
142:81884 Solid optical bodies with multiple crystallographically oriented compositionally different domains and their use. Kirilov, Todor (Vision Crystal Technology AG, Germany). PCT Int. Appl. WO 2004114480 A2 20041229, 26 pp. DESIGNATED STATES: W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW; RW: AT, BE, BF, BJ, CF, CG, CH, CI, CM, CY, DE, DK, ES, FI, FR, GA, GB, GR, IE, IT, LU, MC, ML, MR, NE,

NL, PT, SE, SN, TD, TG, TR. (German). CODEN: PIXXD2. APPLICATION: WO 2004-EP3098 20040324. PRIORITY: DE 2003-10328115 20030620; DE 2003-10355216 20031126.

AB Solid bodies which comprise monoclinic cells in an optically functional area are described in which every location in the optically functional area conforms to essentially the same crystallog. coordinate system and in which the optically functional area includes ≥2 domains having differing chemical compns. Preferably, the bodies, at least in the optically functional area, comprises tungstate and potassium and/or rubidium as a component of the monoclinic elementary cells. Coherent electromagnetic radiation-generating devices employing the bodies are described, as is the use of the bodies in lasers and as waveguides, mirrors, or Bragg reflectors. Optical amplifiers employing the bodies as the amplifying medium are also described.

IT **22723-73-5, Potassium ytterbium tungstate** (**KYb**(**WO4**)**2**)
RL: DEV (Device component use); USES (Uses)
(optical bodies with multiple compositionally different crystallog. oriented domains and their use)

RN 22723-73-5 HCA

CN Potassium tungsten ytterbium oxide (KW2YbO8) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	8	17778-80-2
Yb	1	7440-64-4
W	2	7440-33-7
K	1	7440-09-7

IC ICM H01S003-16

CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

IT **22723-73-5, Potassium ytterbium tungstate** (**KYb**(**WO4**)**2**)
39427-19-5, Potassium yttrium tungstate
RL: DEV (Device component use); USES (Uses)
(optical bodies with multiple compositionally different crystallog. oriented domains and their use)

L35 ANSWER 5 OF 76 HCA COPYRIGHT 2005 ACS on STN

141:303755 Kerr-lens mode-locked operation of Yb:KYW. Mijiti, Palihatl (Dept. of Physics, Xinjiang University, Urumqi, 830046, Peop. Rep. China). Huabei Gongxueyuan Xuebao, 25(1), 18-20 (Chinese) 2004. CODEN: HUGXFH. ISSN: 1006-5431. Publisher: Huabei Gongxueyuan Chubanbu.

AB Using a modified ABCD-matrix approach accounting for nonlinear refraction in active medium, we determined the ranges of cavity parameters providing a mode-locking of Yb:KYW-laser in usual z-fold cavity configuration. Taking the cavity parameters providing a most efficient mode locking and based on fluctuation model, we performed a numerical simulation of laser operation. We used for our calcns.

the side-band pump power of 6 W at 982 nm with 1 cm + 50 μm
beam cross section in active medium and the length of 1 cm for KYW
crystal. Calcns. showed that self-starting operation is possible
with these parameters and dispersion compensation allows for
bandwidth-limited ultra-short pulse generation. The shortest pulse
duration was determined to be approx. 200 fs with self-starting build-up
time of 130 μs. Such a built-up time is comparable and even
shorter than that one for the lasers with semiconductor saturable
absorbers. The region of neg. dispersion provided by prism pair
where a stable ultra-short pulse generation takes place was determined to
be (-17 000.apprx.42 000) fs2.

CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related
Properties)

ST **Ytterbium** ion doped **potassium** yttrium
tungstate solid state laser

L35 ANSWER 6 OF 76 HCA COPYRIGHT 2005 ACS on STN

141:164094 Blue up-conversion emission in Yb- and Tm-codoped potassium
yttrium tungstate. Kuzmin, A. N.; Kachynski, A. V.; Prasad, P. N.;
Demidovich, A. A.; Batay, L. E.; Bednarkiewicz, A.; Strek, W.;
Titov, A. N. (The Institute for Lasers, Photonics, and Biophotonics,
SUNY, University at Buffalo, Buffalo, NY, 14260-3000, USA). Journal
of Applied Physics, 95(12), 7862-7866 (English) 2004. CODEN:
JAPIAU. ISSN: 0021-8979. Publisher: American Institute of Physics.

AB The spectroscopic characteristics of KY(WO4)2 crystal (KYW), codoped
with Yb3+ and Tm3+, were studied from the point of view of
up-conversion blue lasing from 1G4 multiplet. An overall 3H6
multiplet splitting of .apprx.530 cm-1 for the Tm3+ in the KYW host
was obtained. A decay time of .apprx.112 μs for the 1G4 3H6 blue
luminescence in the material doped by 1 atomic% of Tm was measured.
The value of peak emission cross section for this transition is (1.8
± 0.3) + 10-20 cm2. Strong cross-relaxation quenching is 1
of the main channels of nonradiative losses from the 1G4 and 3H4
multiplets. The cross-relaxation rate was significantly higher at
higher concentration of Tm.

CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related
Properties)

ST thulium **ytterbium** codoped **potassium** yttrium
tungstate blue upconversion emission

IT Laser radiation
Luminescence
(blue, up-conversion; in thulium-**ytterbium**-codoped
potassium yttrium **tungstate**)

IT Optical up-conversion
(blue; in thulium-**ytterbium**-codoped **potassium**
yttrium **tungstate**)

L35 ANSWER 7 OF 76 HCA COPYRIGHT 2005 ACS on STN

140:430894 KGW:Yb, Er single crystals growth for eye-safe lasers.
Majchrowski, Andrzej; Mierczyk, Zygmunt; Kopczynski, Krzysztof;
Kwasny, Miroslaw; Michalski, Edward; Zmija, Jozef (Institute of
Applied Physics, Military Univ. of Technology, Warsaw, Pol.).
Proceedings of SPIE-The International Society for Optical

Engineering, 5136(Crystalline Materials for Optoelectronics), 36-40 (English) 2003. CODEN: PSISDG. ISSN: 0277-786X. Publisher: SPIE-The International Society for Optical Engineering.

AB KGd(WO4)2 (KGW) single crystals doped with Yb3+, Er3+, and (Yb3+; Er3+) were grown using Top Seeded Solution Growth (TSSG) technique. Growth was carried out on oriented seeds from self-flux containing 20 mol% of KGW dissolved in K2W2O7. The spectral properties and laser characteristics of obtained single crystals were studied. Absorption spectra of Er3+ and Yb3+-doped KGW were measured in the spectral range 200 ÷ 5000 nm at room temperature Excitation and luminescence spectra were also recorded at room temperature with a JOBIN-YVON spectrofluorometer using a diode laser (POLAROID 4300, 980 nm, 1 W) as an excitation source. The measurements of the lifetime of the Er3+ and Yb3+ ions in the upper laser level of the samples were made by the direct method with pulse excitation. Studies of longitudinally pumped KGW:Yb,Er microlasers with various Yb3+ and Er3+ ions concentration, generating at 1.5 μm were carried out.

CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 75

ST **ytterbium** erbium doped **potassium** gadolinium **tungstate** laser; crystal growth oxide eye safety laser

L35 ANSWER 8 OF 76 HCA COPYRIGHT 2005 ACS on STN

140:207211 Thin disk laser with large numerical aperture pumping. Kafka, James D.; Sutter, Dirk (USA). U.S. Pat. Appl. Publ. US 2004042524 A1 20040304, 12 pp. (English). CODEN: USXXCO. APPLICATION: US 2002-233140 20020830.

AB An optical laser system is described comprising a high power diode pump source; a thin disk gain media; and an optical coupler positioned between the diode pump source and the thin disk gain media (e.g., YbAG, KYbW), the optical coupler producing a beam with a large numerical aperture incident on the thin disk gain media. Another optical laser system is also described comprising at least first and second high power diode pump sources producing first and second pump beams; a thin disk gain media; a first coupler and a second coupler positioned between each of the diode pump sources and the thin disk gain media; and wherein the first and second pump beams are incident on the thin disk gain media from different directions. A method of pumping a thin disk gain media is also described entailing producing a high power diode pump beam from a pump source; passing the high power diode pump beam through an optical coupler positioned between the diode pump source and a thin disk gain media; forming a high numerical aperture output beam from the optical coupler; and positioning the high numerical aperture output beam at an incidence surface of the thin disk gain media.

IT **22723-73-5, Potassium tungsten ytterbium oxide** (**KW2YbO8**)
RL: DEV (Device component use); USES (Uses)
(disk gain medium; thin disk laser using stoichiometric ytterbium crystal with large numerical aperture pumping)

RN 22723-73-5 HCA

CN Potassium tungsten ytterbium oxide (KW2YbO8) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	8	17778-80-2
Yb	1	7440-64-4
W	2	7440-33-7
K	1	7440-09-7

IC ICM H01S003-04
ICS H01S003-09; H01S003-091; H01S003-094
NCL 372075000; 372036000
CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
IT 12005-22-0, Aluminum ytterbium oxide (Al5Yb3O12) **22723-73-5**
, Potassium tungsten ytterbium
oxide (KW2YbO8)
RL: DEV (Device component use); USES (Uses)
(disk gain medium; thin disk laser using stoichiometric ytterbium crystal with large numerical aperture pumping)

L35 ANSWER 9 OF 76 HCA COPYRIGHT 2005 ACS on STN
140:153926 Characterization of the nonlinear refractive index of the laser crystal Yb:KGd(WO4)2. Major, A.; Nikolakakos, I.; Aitchison, J. S.; Ferguson, A. I.; Langford, N.; Smith, P. W. E. (Department of Electrical and Computer Engineering, University of Toronto, Toronto, ON, M5S 3G4, Can.). Applied Physics B: Lasers and Optics, 77(4), 433-436 (English) 2003. CODEN: APBOEM. ISSN: 0946-2171. Publisher: Springer-Verlag.
AB We present results of the characterization of the nonlinear refractive index of the laser crystal Yb:KGd(WO4)2 using a z-scan technique over the 800-1600 nm wavelength range. Based on our exptl. and theor. results, we conclude that the Yb:KGW crystal is a good candidate for efficient Kerr-lens mode locking.
CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
ST **ytterbium** doped **potassium** gadolinium
tungstate nonlinear refractive index
IT 7440-64-4, **Ytterbium**, properties
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(gadolinium **potassium tungstate** doped with; nonlinear refractive index of laser crystal Yb:KGd(WO4)2)

L35 ANSWER 10 OF 76 HCA COPYRIGHT 2005 ACS on STN
140:135668 Spectral parameters of Er3+ ion in Yb3+/Er3+:KY(WO4)2 crystal. Han, Xiumei; Lin, Zhoubin; Hu, Zhushu; Wang, Guofu; Tsuboi, Taiju (Fujian Institute of Research on the Structure of Matter, Chinese Academy of Sciences, Fujian, 350002, Peop. Rep. China). Materials Research Innovations, 7(4), 195-198 (English) 2003. CODEN: MRINFV. ISSN: 1432-8917. Publisher: Springer-Verlag.
AB The spectral parameters of Er3+ in Yb3+/Er3+:KY(WO4)2 crystal with space group C2/c were studied based on Judd-Ofelt theory. The spectral parameters were obtained: the intensity parameters

Ωλ are: Ω2 = 6.33 + 10-20 cm2, Ω4 =
1.35 + 10-20 cm2, Ω6 = 1.90 + 10-20 cm2. The
radiative lifetime and the fluorescence branch ratios were calculated
The emission cross section σe (at 1536 nm) is 2.0 +
10-21 cm2.

CC 73-4 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

ST erbium **ytterbium potassium** yttrium **tungstate** optical spectra; near IR spectra erbium **ytterbium potassium** yttrium **tungstate;** oscillator strength erbium **ytterbium potassium** yttrium **tungstate;** IR fluorescence erbium **ytterbium potassium** yttrium **tungstate;** fluorescence erbium **ytterbium potassium** yttrium **tungstate;** lifetime fluorescence erbium **ytterbium potassium** yttrium **tungstate**

L35 ANSWER 11 OF 76 HCA COPYRIGHT 2005 ACS on STN

140:67195 Efficient self-frequency Raman conversion in a passively Q-switched diode-pumped Yb:KGd(WO4)2 laser. Kisel, V. E.; Shcherbitsky, V. G.; Kuleshov, N. V. (International Laser Center, Minsk, Belarus). Trends in Optics and Photonics, 83(Advanced Solid-State Photonics), 189-192 (English) 2003. CODEN: TOPRBS. Publisher: Optical Society of America.

AB Self-frequency Raman conversion in Q-switched diode-pumped Yb:KGd(WO4)2 laser was demonstrated with fundamental-to-first-Stokes conversion efficiency ≤40%. The output pulses were obtained simultaneously at 1038 nm and at 1145 nm with energy of 10.8 μJ and 8.2 μJ as short as 1.7 ns and 0.7 ns, resp., at the repetition rate of 13.3 kHz.

CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

ST frequency Raman conversion passively Q switched laser; diode pumped **ytterbium** doped **potassium** gadolinium **tungstate** laser

L35 ANSWER 12 OF 76 HCA COPYRIGHT 2005 ACS on STN

139:298749 Research and development of high-performance microchip lasers. I. Ito, Takaki (System Technol. Dep., Ind. Technol. Cent. Wakayama Prefect., Wakayama, Japan). Kenkyu Hokoku - Wakayama-ken Kogyo Gijutsu Senta, Volume Date 2000 53 (Japanese) 2001. CODEN: KHWSEN. ISSN: 1340-5799. Publisher: Wakayama-ken Kogyo Gijutsu Senta.

AB The brief report for obtaining a high-performance microchip laser notices improvements in Ti:sapphire laser beam absorption and reflectivity by means of coating of dielec. multilayers (details are not described) on Yb:KYW surfaces.

CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 76

ST high performance microchip laser; **ytterbium** doped **potassium** yttrium **tungstate** laser; titanium doped sapphire laser activation; dielec coating potassium yttrium

tungstate crystal
IT Electric insulators
(coatings; in high-performance microchip lasers using **ytterbium**-doped **potassium** yttrium **tungstate**)
IT Lasers
(high-performance microchip lasers using **ytterbium** -doped **potassium** yttrium **tungstate**)
IT 7440-00-8, Neodymium, uses
RL: MOA (Modifier or additive use); USES (Uses)
(dopant in laser crystal; for high-performance microchip lasers using **ytterbium**-doped **potassium** yttrium **tungstate**)
IT 7440-64-4, Ytterbium, uses
RL: MOA (Modifier or additive use); USES (Uses)
(dopant; high-performance microchip lasers using **ytterbium**-doped **potassium** yttrium **tungstate**)
IT 12005-21-9, YAG
RL: TEM (Technical or engineered material use); USES (Uses)
(neodymium-doped, laser; for high-performance microchip lasers using **ytterbium**-doped **potassium** yttrium **tungstate**)
IT 39427-19-5, **Potassium** yttrium **tungstate**
RL: TEM (Technical or engineered material use); USES (Uses)
(**ytterbium**-doped; high-performance microchip lasers using **ytterbium**-doped **potassium** yttrium **tungstate**)

L35 ANSWER 13 OF 76 HCA COPYRIGHT 2005 ACS on STN
139:267586 Up-conversion of frequency in Yb3+: KGd(WO4)2 material. Tu, Chao-yang; Li, Jian-fu; Zhu, Zhao-jie; Lin, Jian-ming (Fujian Institute of Research on the Structure of Matter, Chinese Academy of Sciences, Fuzhou, 350002, Peop. Rep. China). Guangpuxue Yu Guangpu Fenxi, 23(3), 438-440 (Chinese) 2003. CODEN: GYGFED. ISSN: 1000-0593. Publisher: Beijing Daxue Chubanshe.
AB By using the method of solid phase synthesis, samples of KYbxGd(1-x)(WO4)2 with different Yb3+ mole fraction of (x = 0.03, 0.08, 0.10, 0.12, 0.15, 0.18, 0.20, 0.25, 0.28) resp. were synthesized when they were heated at 1,000°. Their fluorescence spectra were measured by using LD with a wavelength of 980 nm as the pumping source and RF-540 fluorescence spectrum measurement device. The weak fluorescence at 1,020 nm and strong blue fluorescence at 476 nm were obtained. Also, the relation between the Yb3+ doping mole fraction and the fluorescence intensity at 476 nm was measured. The intensity of blue fluorescence increases rapidly with the increase of Yb3+ doping mole fraction and reaches the highest point at the Yb3+ doping mole fraction of 25%, then drops quickly with the increase of Yb3+ doping mole fraction. Also the fluorescence intensity at 1,020 nm reaches the highest point when the Yb3+ doping mole fraction is .apprx.8%-10%.
CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

ST up conversion **ytterbium** gadolinium **potassium**
tungstate
IT 18923-27-8, Ytterbium(3+), properties 22723-67-7, Gadolinium
potassium tungstate (GdK(WO4)2) 250152-06-8, Gadolinium
potassium tungsten ytterbium
oxide (Gd0.97KW2Yb0.03O8) 602319-21-1 602319-22-2
602319-23-3 602319-24-4 602319-25-5 602319-26-6 602319-27-7
602319-28-8
RL: PRP (Properties)
(up-conversion of frequency in Yb3+: KGd(WO4)2 material)

L35 ANSWER 14 OF 76 HCA COPYRIGHT 2005 ACS on STN
139:107977 On spectroscopic properties of the **KYb(WO4**
)2:Pr3+ crystal. Deren, P. J.; Bednarkiewicz, A.; Mahiou,
R.; Strek, W. (Instytut Niskich Temperatur i Badan Strukturalnych,
Polska Akademia Nauk, Wroclaw, 50950, Pol.). Molecular Physics,
101(7), 951-960 (English) 2003. CODEN: MOPHAM. ISSN: 0026-8976.
Publisher: Taylor & Francis Ltd..
AB Spectroscopic properties of Pr3+ doped **KYb(WO4)**
2 single crystals were studied. The crystal lattice
parameters were determined Energy levels of Pr3+ in **KYb(**
WO4)2 were assigned. The absorption, emission,
excitation, time-resolved emission and excitation spectra were
measured at low (10 K) and at room temperature Decay times of the Pr
emissions are nonexponential and unusually short. Site selection
spectroscopy evidences several different Pr3+ sites. The Judd-Ofelt
intensity model was used to analyze the exptl. data. The
$\Omega\lambda$ parameters, branching ratio and elec. dipole
transition probabilities were determined
IT **22723-73-5, Potassium ytterbium**
tungstate (KYb(WO4)2)
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(doped with praseodymium; spectroscopic properties of **KYb**
(WO4)2:Pr3+ crystal)
RN 22723-73-5 HCA
CN Potassium tungsten ytterbium oxide (KW2YbO8) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	8	17778-80-2
Yb	1	7440-64-4
W	2	7440-33-7
K	1	7440-09-7

CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related
Properties)
Section cross-reference(s): 75
ST spectroscopic property praseodymium doped **potassium**
ytterbium tungstate crystal
IT Luminescence
(polarized; spectroscopic properties of **KYb(WO4**
)2:Pr3+ crystal)

IT Photoexcitation
(spectra; spectroscopic properties of **KYb(WO4**
)2:Pr3+ crystal)
IT Crystal structure
Electronic transition
Energy level
Oscillator strength
Radiative transition
Refractive index
(spectroscopic properties of **KYb(WO4)**
2:Pr3+ crystal)
IT **22723-73-5, Potassium ytterbium**
tungstate (KYb(WO4)2)
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(doped with praseodymium; spectroscopic properties of **KYb**
(WO4)2:Pr3+ crystal)
IT 7440-10-0, Praseodymium, properties 22541-14-6, Praseodymium(3+), properties
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(**potassium ytterbium tungstate**
doped with; spectroscopic properties of **KYb(WO4**
)2:Pr3+ crystal)

L35 ANSWER 15 OF 76 HCA COPYRIGHT 2005 ACS on STN
139:27988 Spectroscopic properties of Er3+ and Yb3+ codoped KY(WO4)2 crystal. Han, Xiumei; Wang, Guofu (Fujian Institute of Research on the Structure of Matter, State Key Lab. of Structural Chemistry, Chinese Academy of Sciences, Fuzhou, 350002, Peop. Rep. China). Zhongguo Xitu Xuebao, 20(6), 584-586 (Chinese) 2002. CODEN: ZXXUE5. ISSN: 1000-4343. Publisher: Yejin Gongye Chubanshe.
AB The absorption and emission spectra of Er- and Yb-codoped KY(WO4)2 crystal were measured at room temperature, resp. The emission spectra excited by 266 and 976 nm show that the mechanism of energy transfer is different.
CC 73-4 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 75
ST erbium **ytterbium** codoped **potassium** yttrium
tungstate crystal absorption emission
IT Energy transfer
IR luminescence
IR spectra
Luminescence
UV and visible spectra
(of erbium-**ytterbium**-codoped **potassium**
yttrium **tungstate** crystal)
IT 18472-30-5, Erbium(3+), properties
RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process); USES (Uses)
(absorption and emission spectra of **ytterbium**-codoped
potassium yttrium **tungstate** crystal containing)

L35 ANSWER 16 OF 76 HCA COPYRIGHT 2005 ACS on STN
138:408875 Continuous-wave lasing of a stoichiometric Yb laser material: **KYb(WO4)2**. Klopp, P.; Petrov, V.; Griebner, U.; Nesterenko, V.; Nikolov, V.; Marinov, M.; Bursukova, M. A.; Galan, M. (Max-Born-Institut, Berlin, D-12489, Germany). Optics Letters, 28(5), 322-324 (English) 2003. CODEN: OPLEDP. ISSN: 0146-9592. Publisher: Optical Society of America.

AB For the 1st time to the authors' knowledge, continuous-wave laser emission of the stoichiometric crystal **KYb(WO4) 2** was achieved at 1068 nm. The 125-μm-thin sample was directly H2O cooled and pumped at 1025 nm by a Ti:sapphire laser. The maximum output power at room temperature was 20 mW.

IT **22723-73-5, Potassium ytterbium tungstate** (**KYb(WO4)2**)
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(continuous-wave lasing of a stoichiometric Yb laser material of **KYb(WO4)2**)

RN 22723-73-5 HCA

CN Potassium tungsten ytterbium oxide (KW2YbO8) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	8	17778-80-2
Yb	1	7440-64-4
W	2	7440-33-7
K	1	7440-09-7

CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

ST continuous wave lasing stoichiometric **ytterbium potassium tungstate**

IT Optical pumping
(by titanium laser; continuous-wave lasing of a stoichiometric Yb laser material of **KYb(WO4)2**)

IT Solid state lasers
(continuous-wave lasing of a stoichiometric Yb laser material of **KYb(WO4)2**)

IT **22723-73-5, Potassium ytterbium tungstate** (**KYb(WO4)2**)
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(continuous-wave lasing of a stoichiometric Yb laser material of **KYb(WO4)2**)

L35 ANSWER 17 OF 76 HCA COPYRIGHT 2005 ACS on STN
138:408872 **Potassium ytterbium tungstate** provides the smallest laser quantum defect. Klopp, Peter; Petrov, Valentin; Griebner, Uwe (Max-Born-Institut, Berlin, D-12489, Germany). Japanese Journal of Applied Physics, Part 2: Letters, 42(3A), L246-L248 (English) 2003. CODEN: JAPLD8. Publisher: Japan Society of Applied Physics.

AB The smallest quantum defect for an optically pumped laser crystal could be demonstrated at room temperature, using a 125 μm-thin platelet

of **KYb(WO4)2**, a stoichiometric Yb
laser material. While pumping at 1025 nm, lasing occurred at 1042
nm which corresponds to a quantum defect of only 1.6%.

IT **22723-73-5, Potassium ytterbium tungstate** (**KYb(WO4)2**)
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(**potassium ytterbium tungstate** provides the smallest laser quantum defect)

RN 22723-73-5 HCA

CN Potassium tungsten ytterbium oxide (KW2YbO8) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	8	17778-80-2
Yb	1	7440-64-4
W	2	7440-33-7
K	1	7440-09-7

CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

ST **potassium ytterbium tungstate** IR laser quantum defect

IT Optical gain
(calculated; in **potassium ytterbium tungstate** providing smallest laser quantum defect)

IT IR spectra
(near-IR, absorption; of **potassium ytterbium tungstate**)

IT IR luminescence
(near-IR; of **potassium ytterbium tungstate**)

IT IR laser radiation
IR lasers
(near-IR; **potassium ytterbium tungstate** providing smallest laser quantum defect)

IT Quantum defect
Solid state lasers
(**potassium ytterbium tungstate** providing smallest laser quantum defect)

IT **22723-73-5, Potassium ytterbium tungstate** (**KYb(WO4)2**)
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(**potassium ytterbium tungstate** provides the smallest laser quantum defect)

L35 ANSWER 18 OF 76 HCA COPYRIGHT 2005 ACS on STN

138:345620 Sensitization of Er3+ emission at 1.5 μm by Yb3+ in **KYb(WO4)2** single crystals. Mateos, X.; Pujol, M. C.; Guell, F.; Sole, R.; Gavalda, Jna.; Aguilo, M.; Diaz, F.; Massons, J. (Laboratori de Fisica i Cristal·lografia de Materials (FiCMA) and IEA, Universitat Rovira i Virgili, Tarragona, 43005, Spain). Physical Review B: Condensed Matter and Materials

Physics, 66(21), 214104/1-214104/12 (English) 2002. CODEN: PRBMDO.
ISSN: 0163-1829. Publisher: American Physical Society.

AB We present our recent achievements in the growth and spectroscopic characterization of **KYb(WO4)2** crystals doped with erbium ions (hereafter KYbW:Er). We grew single crystals of KYbW:Er at several erbium concns. with optimal crystalline quality by the top-seeded-solution growth (TSSG) slow-cooling method. We carried out spectroscopic measurements related to the polarized optical absorption and optical emission at room temperature (RT) and low temperature (6 K). The splitting of the excited energy levels and the ground energy level of erbium in KYbW were determined, derived from the absorption and emission measurements at 6 K, resp. We determined the near IR, around 1.5 μm (6667 cm-1), emission channels from the emission spectrum, and used the reciprocity method to calculate a maximum emission cross section of 2.7+10-20 cm2 for the polarization parallel to the Nm principal optical direction for the 1.534 μm (6519 cm-1) IR emission. We measured the lifetime of the 2F5/2→2F7/2 transition of ytterbium and the 4I13/2→4I15/2 transition of erbium at RT for several erbium concns. Finally, we present the Judd-Ofelt calcns. for the KYbW:Er system.

IT **22723-73-5, Potassium ytterbium tungstate** (**KYb(WO4)2**)
RL: PRP (Properties)
(undoped and erbium-doped crystals; sensitization of Er3+ emission at 1.5 μm by Yb3+ in **KYb(WO4)2** single crystals)

RN 22723-73-5 HCA

CN Potassium tungsten ytterbium oxide (KW2YbO8) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	8	17778-80-2
Yb	1	7440-64-4
W	2	7440-33-7
K	1	7440-09-7

CC 73-4 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 75, 78

ST erbium doping **potassium ytterbium tungstate** crystal photoluminescence polarized absorption

IT Polarized optical spectra
(UV and visible absorption; sensitization of Er3+ emission at 1.5 μm by Yb3+ in **KYb(WO4)2** single crystals)

IT Doping
(effect of doping concentration; sensitization of Er3+ emission at 1.5 μm by Yb3+ in **KYb(WO4)2** single crystals)

IT Electronic transition

(energy; sensitization of Er3+ emission at 1.5 μm by Yb3+ in **KYb(WO4)2** single crystals)
IT Energy transfer
(erbium-ytterbium; sensitization of Er3+ emission at 1.5 μm by Yb3+ in **KYb(WO4)2** single crystals)
IT Energy level splitting
(excited state; sensitization of Er3+ emission at 1.5 μm by Yb3+ in **KYb(WO4)2** single crystals)
IT Polarized IR spectra
(near-IR absorption; sensitization of Er3+ emission at 1.5 μm by Yb3+ in **KYb(WO4)2** single crystals)
IT IR luminescence
(near-IR; sensitization of Er3+ emission at 1.5 μm by Yb3+ in **KYb(WO4)2** single crystals)
IT Fluorescence decay
Optical anisotropy
(sensitization of Er3+ emission at 1.5 μm by Yb3+ in **KYb(WO4)2** single crystals)
IT Excited state
(splitting, lifetime; sensitization of Er3+ emission at 1.5 μm by Yb3+ in **KYb(WO4)2** single crystals)
IT Oscillator strength
(theor. vs. exptl.; sensitization of Er3+ emission at 1.5 μm by Yb3+ in **KYb(WO4)2** single crystals)
IT Crystal growth
(top-seeded-solution; sensitization of Er3+ emission at 1.5 μm by Yb3+ in **KYb(WO4)2** single crystals)
IT 517906-56-8
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process)
(crystal; sensitization of Er3+ emission at 1.5 μm by Yb3+ in **KYb(WO4)2** single crystals)
IT 517906-57-9 517906-58-0
RL: PRP (Properties)
(crystal; sensitization of Er3+ emission at 1.5 μm by Yb3+ in **KYb(WO4)2** single crystals)
IT 7440-52-0, Erbium, properties 18472-30-5, Erbium(3+), properties
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(**potassium ytterbium tungstate** doped with; sensitization of Er3+ emission at 1.5 μm by Yb3+ in **KYb(WO4)2** single crystals)
IT **22723-73-5, Potassium ytterbium tungstate** (**KYb(WO4)2**)
RL: PRP (Properties)
(undoped and erbium-doped crystals; sensitization of Er3+ emission at 1.5 μm by Yb3+ in **KYb(WO4)2** single crystals)

L35 ANSWER 19 OF 76 HCA COPYRIGHT 2005 ACS on STN
138:262179 Up-conversion luminescence of ytterbium and thulium codoped

potassium yttrium double tungstate crystal. Cheng, Z. X.; Yi, X. J.; Han, J. R.; Chen, H. C.; Wang, X. L.; Liu, H. K.; Dou, S. X.; Song, F.; Guo, H. C. (The State Key Lab of crystal materials, Shandong University, Jinan, 250100, Peop. Rep. China). Crystal Research and Technology, 37(12), 1318-1324 (English) 2002. CODEN: CRTEDF. ISSN: 0232-1300. Publisher: Wiley-VCH Verlag GmbH & Co. KGaA.

AB Tm and Yb co-doped double tungstate Yb3+,Tm3+: NaY(WO4)2 single crystals were prepared by using RF-heating Czochralski (CZ) pulling method. Its polarized transmittance spectra were recorded at 290-2000 nm at room temperature The energy levels transitions were assigned to the corresponding absorption line. The up-conversion luminescences at 793 nm and 475 nm were measured when the sample were pumped by 972 nm LD and the energy transfer mechanism between Yb3+ and Tm3+ ions was analyzed.

CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

ST upconversion luminescence **ytterbium** thulium codoped **potassium** yttrium **tungstate** crystal

L35 ANSWER 20 OF 76 HCA COPYRIGHT 2005 ACS on STN

138:195307 Efficient tunable laser operation of diode-pumped Yb,Tm:KY(WO4)2 around 1.9 µm. Batay, L. E.; Demidovich, A. A.; Kuzmin, A. N.; Titov, A. N.; Mond, M.; Kueck, S. (Institute of Molecular and Atomic Physics, National Academy of Sciences of Belarus, Minsk, 220 072, Belarus). Applied Physics B: Lasers and Optics, 75(4-5), 457-461 (English) 2002. CODEN: APBOEM. ISSN: 0946-2171. Publisher: Springer-Verlag.

AB A new laser medium - Yb,Tm:KY(WO4)2 - for diode pumped solid state laser applications operating around 1.9 to 2.0 µm was studied and the main laser characteristics are presented. Diode pumping at 981 nm and around 805 nm was realized. For 981-nm pumping, the excitation occurs into Yb3+ ions followed by an energy transfer to Tm3+ions. A slope efficiency of 19% was realized. For pumping around 805 nm, the excitation occurs directly into the Tm3+ ions. Here a maximum slope efficiency of 52%, an optical efficiency of 40%, and output powers of >1 W were realized. Using a birefringent quartz plate as an intracavity tuning element, the tunability of the Yb,Tm:KY(WO4)2 laser in the spectral range of 1.85-2.0 µm was demonstrated. The possibility of laser operation in a microchip cavity configuration for this material also was shown.

CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

ST **ytterbium** thulium **potassium** yttrium **tungstate** near IR laser tunable; near IR spectra **ytterbium** thulium **potassium** yttrium **tungstate** laser; visible spectra **ytterbium** thulium **potassium** yttrium **tungstate** laser; energy transfer **ytterbium** thulium **potassium** yttrium **tungstate** laser

IT 7440-30-4, Thulium, properties 7440-64-4, Ytterbium, properties 18923-27-8, Ytterbium 3+, properties 22541-23-7, Thulium(3+), properties

RL: DEV (Device component use); MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process); USES (Uses)
(thulium- and **ytterbium**-doped **potassium** yttrium **tungstate**; efficient tunable laser operation of diode-pumped Yb,Tm:KY(WO4)2 around 1.9 μm)

IT 20596-83-2, Potassium yttrium tungstate (KY(WO4)2)
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process); USES (Uses)
(thulium- and **ytterbium**-doped **potassium** yttrium **tungstate**; efficient tunable laser operation of diode-pumped Yb,Tm:KY(WO4)2 around 1.9 μm)

L35 ANSWER 21 OF 76 HCA COPYRIGHT 2005 ACS on STN
138:195114 Crystal growth and spectroscopic characterization of Tm3+-doped **KYb(WO4)2** single crystals.
Pujol, M. C.; Guell, F.; Mateos, X.; Gavalda, Jna.; Sole, R.; Massons, J.; Aguilo, M.; Diaz, F.; Boulon, G.; Brenier, A. (Universitat Rovira i Virgili, Laboratori de Fisica i Cristal·lografia de Materials (FiCMA) and IEA, Tarragona, 43005, Spain). Physical Review B: Condensed Matter and Materials Physics, 66(14), 144304/1-144304/8 (English) 2002. CODEN: PRBMDO. ISSN: 0163-1829. Publisher: American Physical Society.

AB In this paper we present the crystal growth and optical characterization of thulium-doped **KYb(WO4)2** (hereafter KYbW). We grew thulium-doped KYbW monoclinic single crystals with optimal crystalline quality by the top-seeded-solution-growth (TSSG) slow-cooling method. Thulium spectroscopy was characterized in this host. The Judd-Ofelt parameters determined were Ω2=0.14+10-20 cm2, Ω4=0.21+10-20 cm2, and Ω6=0.10+10-20 cm2. The room temperature lifetimes measured for KYbW:Tm 1% were τ(1G4)=60-70 μs, τ(3H4)=90 μs and τ(3F4)=200 μs. We calculated the emission cross section for several channels. There was an important blue emission after pumping resonantly to the stoichiometric ytterbium at 980 nm, and we studied the emission channels of thulium. The presence of thulium luminescence is proof of the large transfer of energy in this compound

IT **22723-73-5, Potassium ytterbium tungstate (KYb(WO4)2)**
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process)
(thulium-doped single crystal; crystal growth and spectroscopic characterization of thulium-doped **KYb(WO4)2** single crystals)

RN 22723-73-5 HCA
CN Potassium tungsten ytterbium oxide (KW2YbO8) (9CI) (CA INDEX NAME)

Component	Ratio	Component Registry Number
O	8	17778-80-2

Yb	1	7440-64-4
W	2	7440-33-7
K	1	7440-09-7

CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 75
ST thulium doped **potassium ytterbium tungstate** crystal growth absorption luminescence
IT Luminescence quenching
(concentration; of thulium-doped **KYb(WO4)2** single crystals)
IT Crystal growth
(crystal size; of thulium-doped **KYb(WO4)2** single crystals)
IT Doping
(effect of doping concentration; crystal growth and spectroscopic characterization of thulium-doped **KYb(WO4)2** single crystals)
IT Luminescence
(laser-induced, optical; of thulium-doped **KYb(WO4)2** single crystals)
IT Excited state
(lifetime; of thulium-doped **KYb(WO4)2** single crystals)
IT Polarized IR spectra
(near-IR, temperature-dependent; of thulium-doped **KYb(WO4)2** single crystals)
IT Energy transfer
(nonresonant, Tm-Yb; in thulium-doped **KYb(WO4)2** single crystals)
IT Energy level
(of thulium ion; crystal growth and spectroscopic characterization of thulium-doped **KYb(WO4)2** single crystals)
IT Crystal field splitting
Fluorescence decay
(of thulium-doped **KYb(WO4)2** single crystals)
IT Radiative transition
(rate and lifetime; crystal growth and spectroscopic characterization of thulium-doped **KYb(WO4)2** single crystals)
IT Polarized optical spectra
(temperature-dependent; of thulium-doped **KYb(WO4)2** single crystals)
IT 499138-81-7 499138-82-8 499138-83-9
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process)
(crystal growth and spectroscopic characterization of thulium-doped **KYb(WO4)2** single crystals)
IT 7440-30-4, Thulium, properties 22541-23-7, Thulium(3+), properties

RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process); USES (Uses)
(**potassium ytterbium tungstate** single crystal doped with; crystal growth and spectroscopic characterization of thulium-doped **KYb(WO4)** **2** single crystals)

IT **22723-73-5, Potassium ytterbium tungstate** (**KYb(WO4)2**)
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process)
(thulium-doped single crystal; crystal growth and spectroscopic characterization of thulium-doped **KYb(WO4)** **2** single crystals)

L35 ANSWER 22 OF 76 HCA COPYRIGHT 2005 ACS on STN
138:177792 Passively Q-switched diode-pumped 1.9 µm Yb,Tm:KYW laser. Kuzmin, A. N.; Nikeenko, N. K.; Demidovich, A. A.; Titov, A. N.; Mond, M.; Kueck, S.; Kisel, V. E.; Kuleshov, N. V. (Stepanov Institute of Physics, National Academy of Sciences of Belarus, Minsk, 220072, Belarus). Trends in Optics and Photonics, 68(Advanced Solid-State Lasers), 575-577 (English) 2002. CODEN: TOPRBS. Publisher: Optical Society of America.

AB Passively Q-switched operation of a Yb:Tm:KYW laser diode-pumped at 980 and 806 nm was studied. A thin plate of Cr:ZnSe was used as a saturable absorber for passive Q-switching. Maximum average output power of 32 mW at 1.9 µm in comparison to 208 mW for continuous wave regime of operation at the same pumping level was obtained.

CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

ST diode pumped thulium **ytterbium potassium** yttrium **tungstate** IR laser

IT IR lasers
(thulium-**ytterbium**-doped **potassium** yttrium **tungstate** passively Q-switched diode-pumped)

IT 7440-30-4, Thulium, uses
RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)
(-**ytterbium**-doped **potassium** yttrium **tungstate** passively Q-switched diode-pumped IR laser)

L35 ANSWER 23 OF 76 HCA COPYRIGHT 2005 ACS on STN
138:177777 Yb:KYW microchip laser performance: fundamental frequency generation and Raman self-frequency conversion. Grabtchikov, A. S.; Kuzmin, A. N.; Lisinetskii, V. A.; Orlovich, V. A.; Demidovich, A. A.; Danailov, M. B.; Eichler, H. J.; Bednarkiewicz, A.; Strek, W.; Titov, A. N. (Institute of Physics, National Academy of Sciences of Belarus, Minsk, 220072, Belarus). Trends in Optics and Photonics, 68(Advanced Solid-State Lasers), 394-396 (English) 2002. CODEN: TOPRBS. Publisher: Optical Society of America.

AB Diode pumped Yb:KYW microchip laser in passively Q-switched and continuous-wave regimes is demonstrated. A slope efficiency of 23% was achieved for continuous-wave operation. Raman self-frequency

conversion for the microchip configuration was obtained.
CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
ST **ytterbium potassium** tungsten **tungstate**
laser microchip Raman frequency conversion

L35 ANSWER 24 OF 76 HCA COPYRIGHT 2005 ACS on STN
138:63432 Sensitivity and stability of a radiation-balanced laser system. Bowman, Steven R.; Jenkins, Neil W.; O'Connor, Shawn P.; Feldman, Barry J. (Photonics Technology Branch, U.S. Naval Research Lab, Washington, DC, 20375, USA). IEEE Journal of Quantum Electronics, 38(10), 1339-1348 (English) 2002. CODEN: IEJQA7. ISSN: 0018-9197. Publisher: Institute of Electrical and Electronics Engineers.
AB It was previously shown that it is theor. possible to build a solid-state laser that generates no internal heat. This is accomplished through a detailed balance of the stimulated and spontaneous emission. Such a device is called a radiation-balanced laser. Here, the authors analyze laser operation when conditions deviate from perfect balance. Sensitivity and stability analyzes are presented for perturbations in the field parameters and temperature The radiation balance is a stable equilibrium under both transient and steady-state perturbations. Limits are derived on the magnitude of allowable spatial perturbations, and techniques for spatial mode matching are discussed. Numerical simulations of 1-μm laser operation of **Yb**-doped **K** Gd **tungstate**
are provided as an example.
CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
ST laser solid state sensitivity radiation balanced system heating;
ytterbium potassium gadolinium **tungstate**
laser radiation balanced sensitivity stability; near IR fluorescence
ytterbium potassium gadolinium **tungstate**
laser
IT 7440-64-4, Ytterbium, properties
RL: DEV (Device component use); MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(**ytterbium**-doped gadolinium **potassium tungstate**; sensitivity and stability of radiation-balanced laser system with)
IT 22723-67-7, Gadolinium potassium tungstate gdk(**wo4**)2
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(**ytterbium**-doped gadolinium **potassium tungstate**; sensitivity and stability of radiation-balanced laser system with)

L35 ANSWER 25 OF 76 HCA COPYRIGHT 2005 ACS on STN
137:239353 240-fs pulses with 22-W average power from a mode-locked thin-disk Yb:KY(WO4)2 laser. Brunner, F.; Sudmeyer, T.; Innerhofer, E.; Morier-Genoud, F.; Paschotta, R.; Kisel, V. E.; Shcherbitsky, V. G.; Kuleshov, N. V.; Gao, J.; Contag, K.; Giesen, A.; Keller, U. (Physics Department/Institute of Quantum Electronics, Swiss Federal Institute of Technology (ETH), ETH Zurich Honggerberg-HPT, Zurich,

CH-8093, Switz.). Optics Letters, 27(13), 1162-1164 (English) 2002.
CODEN: OPLEDP. ISSN: 0146-9592. Publisher: Optical Society of
America.

AB We demonstrate what is to our knowledge the first passively
mode-locked thin-disk Yb:KY(WO4)2 laser. The laser produces pulses
of 240-fs duration with an average power of 22 W at a center wavelength
of 1028 nm. At a pulse repetition rate of 25 MHz, the pulse energy
is 0.9 μJ, and the peak power is as high as 3.3 MW. The beam
quality is very close to the diffraction limit, with M2 = 1.1.

CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related
Properties)

ST **ytterbium** doped **potassium** yttrium
tungstate laser IR femtosecond pulse

IT 7440-64-4, **Ytterbium**, uses
RL: DEV (Device component use); MOA (Modifier or additive use); USES
(Uses)
(**potassium** yttrium **tungstate** doped with;
near-IR 240-fs pulses with 22-W average power from a mode-locked
thin-disk Yb:KY(WO4)2 laser)

```
=> d que l42
L4           1 SEA FILE=REGISTRY ABB=ON  PLU=ON  22723-73-5/RN
L5          36 SEA FILE=HCA ABB=ON  PLU=ON  L4
L6           2 SEA FILE=HCA ABB=ON  PLU=ON  L4/P
L19          3 SEA FILE=HCA ABB=ON  PLU=ON  (POTASSIUM OR K)(W)(TUNGSTEN
               OR W)(W)(YTTERBIUM? OR YB)(W)OXID?
L25         67 SEA FILE=HCA ABB=ON  PLU=ON  (POTASSIUM OR K)(2A)(YTTERBI
               UM? OR YB)(2A)(TUNGSTAT? OR WO4 OR ((DOUBLE OR 2)(W)WOLFR
               AMATE)) OR KW2YBO8 OR KYB(W)WO4(W)2 OR KYB(W)WO.SUB.4(W)S
               UB.2
L27         32 SEA FILE=HCA ABB=ON  PLU=ON  (POTASSIUM OR K)(A)(YTTERBIU
               M? OR YB)(A)(TUNGSTAT? OR WO4 OR ((DOUBLE OR 2)(W)WOLFRAM
               ATE)) OR KW2YBO8 OR KYB(W)WO4(W)2 OR KYB(W)WO.SUB.4(W)SUB
               .2
L29         42 SEA FILE=HCA ABB=ON  PLU=ON  L27 OR L19 OR L6 OR L5
L34     243245 SEA FILE=HCA ABB=ON  PLU=ON  (SINGLE OR MONO)(A)(CRYSTAL?
               OR CRYST)
L35         76 SEA FILE=HCA ABB=ON  PLU=ON  L25 OR L19 OR L5 OR L6
L36         17 SEA FILE=HCA ABB=ON  PLU=ON  L34 AND L35
L38         59 SEA FILE=HCA ABB=ON  PLU=ON  L35 NOT L36
L39         25 SEA FILE=HCA ABB=ON  PLU=ON  L38 AND L5
L42         34 SEA FILE=HCA ABB=ON  PLU=ON  (L35 OR L29) NOT (L36 OR
               L39)
```

=> d l42 1-34 cbib abs hitstr hitind

NO

L42 ANSWER 1 OF 34 HCA
142:102596 Growth, optical characterization, and laser operation of
epitaxial Yb: KY(WO4)2 /KY(WO4)2 composites with monoclinic
structure. Aznar, A.; Sole, R.; Aguilo, M.; Diaz, F.; Griebner, U.;
Grunwald, R.; Petrov, V. (Grup de Fisica i Cristal lografia de

Materials (FiCMA), Universitat Rovira i Virgili, Tarragona, 1, 43005, Spain). Applied Physics Letters, 85(19), 4313-4315 (English) 2004. CODEN: APPLAB. ISSN: 0003-6951. Publisher: American Institute of Physics.

AB Epitaxial monoclinic double tungstate laser crystals were grown with high crystalline quality. Based on these Yb-doped composites, laser operation was demonstrated. Continuous-wave laser emission of a Yb:KYW/KYW crystal was achieved at 1030 nm. The 25-μm-thin Yb:KYW layer was pumped at wavelengths near 980 nm by a Ti:sapphire laser. A maximum output power of 40 mW was obtained at room temperature

CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 75

ST **potassium ytterbium** yttrium **tungstate**
IR laser crystal

IT Crystal structure
(of **potassium ytterbium** yttrium **tungstate** as laser crystal)

141:303755 Kerr-lens mode-locked operation of Yb:KYW. Mijiti, Palihatl (Dept. of Physics, Xinjiang University, Urumqi, 830046, Peop. Rep. China). Huabei Gongxueyuan Xuebao, 25(1), 18-20 (Chinese) 2004. CODEN: HUGXFH. ISSN: 1006-5431. Publisher: Huabei Gongxueyuan Chubanbu.

AB Using a modified ABCD-matrix approach accounting for nonlinear refraction in active medium, we determined the ranges of cavity parameters providing a mode-locking of Yb:KYW-laser in usual z-fold cavity configuration. Taking the cavity parameters providing a most efficient mode locking and based on fluctuation model, we performed a numerical simulation of laser operation. We used for our calcns. the side-band pump power of 6 W at 982 nm with 1 cm + 50 μm beam cross section in active medium and the length of 1 cm for KYW crystal. Calcns. showed that self-starting operation is possible with these parameters and dispersion compensation allows for bandwidth-limited ultra-short pulse generation. The shortest pulse duration was determined to be approx. 200 fs with self-starting build-up time of 130 μs. Such a built-up time is comparable and even shorter than that one for the lasers with semiconductor saturable absorbers. The region of neg. dispersion provided by prism pair where a stable ultra-short pulse generation takes place was determined to be (-17 000.apprx.42 000) fs2.

CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

ST **Ytterbium** ion doped **potassium** yttrium **tungstate** solid state laser

141:164094 Blue up-conversion emission in Yb- and Tm-codoped potassium yttrium tungstate. Kuzmin, A. N.; Kachynski, A. V.; Prasad, P. N.; Demidovich, A. A.; Batay, L. E.; Bednarkiewicz, A.; Strek, W.; Titov, A. N. (The Institute for Lasers, Photonics, and Biophotonics, SUNY, University at Buffalo, Buffalo, NY, 14260-3000, USA). Journal

of Applied Physics, 95(12), 7862-7866 (English) 2004. CODEN: JAPIAU. ISSN: 0021-8979. Publisher: American Institute of Physics.

AB The spectroscopic characteristics of KY(WO4)2 crystal (KYW), codoped with Yb3+ and Tm3+, were studied from the point of view of up-conversion blue lasing from 1G4 multiplet. An overall 3H6 multiplet splitting of .apprx.530 cm-1 for the Tm3+ in the KYW host was obtained. A decay time of .apprx.112 μs for the 1G4 3H6 blue luminescence in the material doped by 1 atomic% of Tm was measured. The value of peak emission cross section for this transition is (1.8 ± 0.3) + 10-20 cm2. Strong cross-relaxation quenching is 1 of the main channels of nonradiative losses from the 1G4 and 3H4 multiplets. The cross-relaxation rate was significantly higher at higher concentration of Tm.

CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

ST thulium **ytterbium** codoped **potassium** yttrium **tungstate** blue upconversion emission

IT Laser radiation
Luminescence
(blue, up-conversion; in thulium-**ytterbium**-codoped **potassium** yttrium **tungstate**)

IT Optical up-conversion
(blue; in thulium-**ytterbium**-codoped **potassium** yttrium **tungstate**)

L42 ANSWER 4 OF 34 HCA COPYRIGHT 2005 ACS on STN

140:153926 Characterization of the nonlinear refractive index of the laser crystal Yb:KGd(WO4)2. Major, A.; Nikolakakos, I.; Aitchison, J. S.; Ferguson, A. I.; Langford, N.; Smith, P. W. E. (Department of Electrical and Computer Engineering, University of Toronto, Toronto, ON, M5S 3G4, Can.). Applied Physics B: Lasers and Optics, 77(4), 433-436 (English) 2003. CODEN: APBOEM. ISSN: 0946-2171. Publisher: Springer-Verlag.

AB We present results of the characterization of the nonlinear refractive index of the laser crystal Yb:KGd(WO4)2 using a z-scan technique over the 800-1600 nm wavelength range. Based on our exptl. and theor. results, we conclude that the Yb:KGW crystal is a good candidate for efficient Kerr-lens mode locking.

CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

ST **ytterbium** doped **potassium** gadolinium **tungstate** nonlinear refractive index

IT 7440-64-4, **Ytterbium**, properties
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(gadolinium **potassium tungstate** doped with; nonlinear refractive index of laser crystal Yb:KGd(WO4)2)

L42 ANSWER 5 OF 34 HCA COPYRIGHT 2005 ACS on STN

140:135668 Spectral parameters of Er3+ ion in Yb3+/Er3+:KY(WO4)2 crystal. Han, Xiumei; Lin, Zhoubin; Hu, Zhushu; Wang, Guofu; Tsuboi, Taiju (Fujian Institute of Research on the Structure of Matter, Chinese Academy of Sciences, Fujian, 350002, Peop. Rep. China). Materials Research Innovations, 7(4), 195-198 (English)

2003. CODEN: MRINFV. ISSN: 1432-8917. Publisher: Springer-Verlag.
AB The spectral parameters of Er3+ in Yb3+/Er3+:KY(WO4)2 crystal with space group C2/c were studied based on Judd-Ofelt theory. The spectral parameters were obtained: the intensity parameters Ωλ are: Ω2 = 6.33 + 10-20 cm2, Ω4 = 1.35 + 10-20 cm2, Ω6 = 1.90 + 10-20 cm2. The radiative lifetime and the fluorescence branch ratios were calculated The emission cross section σe (at 1536 nm) is 2.0 + 10-21 cm2.
CC 73-4 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
ST erbium **ytterbium potassium** yttrium **tungstate** optical spectra; near IR spectra erbium **ytterbium potassium** yttrium **tungstate;** oscillator strength erbium **ytterbium potassium** yttrium **tungstate;** IR fluorescence erbium **ytterbium potassium** yttrium **tungstate;** fluorescence erbium **ytterbium potassium** yttrium **tungstate;** lifetime fluorescence erbium **ytterbium potassium** yttrium **tungstate**

L42 ANSWER 6 OF 34 HCA COPYRIGHT 2005 ACS on STN
140:67195 Efficient self-frequency Raman conversion in a passively Q-switched diode-pumped Yb:KGd(WO4)2 laser. Kisel, V. E.; Shcherbitsky, V. G.; Kuleshov, N. V. (International Laser Center, Minsk, Belarus). Trends in Optics and Photonics, 83(Advanced Solid-State Photonics), 189-192 (English) 2003. CODEN: TOPRBS. Publisher: Optical Society of America.
AB Self-frequency Raman conversion in Q-switched diode-pumped Yb:KGd(WO4)2 laser was demonstrated with fundamental-to-first-Stokes conversion efficiency ≤40%. The output pulses were obtained simultaneously at 1038 nm and at 1145 nm with energy of 10.8 μJ and 8.2 μJ as short as 1.7 ns and 0.7 ns, resp., at the repetition rate of 13.3 kHz.
CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
ST frequency Raman conversion passively Q switched laser; diode pumped **ytterbium** doped **potassium** gadolinium **tungstate** laser

L42 ANSWER 7 OF 34 HCA COPYRIGHT 2005 ACS on STN
139:298749 Research and development of high-performance microchip lasers. I. Ito, Takaki (System Technol. Dep., Ind. Technol. Cent. Wakayama Prefect., Wakayama, Japan). Kenkyu Hokoku - Wakayama-ken Kogyo Gijutsu Senta, Volume Date 2000 53 (Japanese) 2001. CODEN: KHWSEN. ISSN: 1340-5799. Publisher: Wakayama-ken Kogyo Gijutsu Senta.
AB The brief report for obtaining a high-performance microchip laser notices improvements in Ti:sapphire laser beam absorption and reflectivity by means of coating of dielec. multilayers (details are not described) on Yb:KYW surfaces.
CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

Section cross-reference(s): 76
ST high performance microchip laser; **ytterbium** doped **potassium** yttrium **tungstate** laser; titanium doped sapphire laser activation; dielec coating potassium yttrium tungstate crystal
IT Electric insulators
(coatings; in high-performance microchip lasers using **ytterbium**-doped **potassium** yttrium **tungstate**)
IT Lasers
(high-performance microchip lasers using **ytterbium** -doped **potassium** yttrium **tungstate**)
IT 7440-00-8, Neodymium, uses
RL: MOA (Modifier or additive use); USES (Uses)
(dopant in laser crystal; for high-performance microchip lasers using **ytterbium**-doped **potassium** yttrium **tungstate**)
IT 7440-64-4, Ytterbium, uses
RL: MOA (Modifier or additive use); USES (Uses)
(dopant; high-performance microchip lasers using **ytterbium**-doped **potassium** yttrium **tungstate**)
IT 12005-21-9, YAG
RL: TEM (Technical or engineered material use); USES (Uses)
(neodymium-doped, laser; for high-performance microchip lasers using **ytterbium**-doped **potassium** yttrium **tungstate**)
IT 39427-19-5, **Potassium** yttrium **tungstate**
RL: TEM (Technical or engineered material use); USES (Uses)
(**ytterbium**-doped; high-performance microchip lasers using **ytterbium**-doped **potassium** yttrium **tungstate**)

L42 ANSWER 8 OF 34 HCA
139:267586 Up-conversion of frequency in Yb3+: KGd(WO4)2 material. Tu, Chao-yang; Li, Jian-fu; Zhu, Zhao-jie; Lin, Jian-ming (Fujian Institute of Research on the Structure of Matter, Chinese Academy of Sciences, Fuzhou, 350002, Peop. Rep. China). Guangpuxue Yu Guangpu Fenxi, 23(3), 438-440 (Chinese) 2003. CODEN: GYGFED. ISSN: 1000-0593. Publisher: Beijing Daxue Chubanshe.
AB By using the method of solid phase synthesis, samples of KYbxGd(1-x)(WO4)2 with different Yb3+ mole fraction of (x = 0.03, 0.08, 0.10, 0.12, 0.15, 0.18, 0.20, 0.25, 0.28) resp. were synthesized when they were heated at 1,000°. Their fluorescence spectra were measured by using LD with a wavelength of 980 nm as the pumping source and RF-540 fluorescence spectrum measurement device. The weak fluorescence at 1,020 nm and strong blue fluorescence at 476 nm were obtained. Also, the relation between the Yb3+ doping mole fraction and the fluorescence intensity at 476 nm was measured. The intensity of blue fluorescence increases rapidly with the increase of Yb3+ doping mole fraction and reaches the highest point at the Yb3+ doping mole fraction of 25%, then drops quickly with the increase of Yb3+ doping mole fraction.

Also the fluorescence intensity at 1,020 nm reaches the highest point when the Yb3+ doping mole fraction is .apprx.8%-10%.

CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

ST up conversion **ytterbium** gadolinium **potassium** **tungstate**

IT 18923-27-8, Ytterbium(3+), properties 22723-67-7, Gadolinium potassium tungstate (GdK(WO4)2) 250152-06-8, Gadolinium **potassium tungsten ytterbium** **oxide** (Gd0.97KW2Yb0.03O8) 602319-21-1 602319-22-2 602319-23-3 602319-24-4 602319-25-5 602319-26-6 602319-27-7 602319-28-8
RL: PRP (Properties)
(up-conversion of frequency in Yb3+: KGd(WO4)2 material)

L42 ANSWER 9 OF 34 HCA COPYRIGHT 2005 ACS on STN

139:27988 Spectroscopic properties of Er3+ and Yb3+ codoped KY(WO4)2 crystal. Han, Xiumei; Wang, Guofu (Fujian Institute of Research on the Structure of Matter, State Key Lab. of Structural Chemistry, Chinese Academy of Sciences, Fuzhou, 350002, Peop. Rep. China). Zhongguo Xitu Xuebao, 20(6), 584-586 (Chinese) 2002. CODEN: ZXXUE5. ISSN: 1000-4343. Publisher: Yejin Gongye Chubanshe.

AB The absorption and emission spectra of Er- and Yb-codoped KY(WO4)2 crystal were measured at room temperature, resp. The emission spectra excited by 266 and 976 nm show that the mechanism of energy transfer is different.

CC 73-4 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
Section cross-reference(s): 75

ST erbium **ytterbium** codoped **potassium** yttrium **tungstate** crystal absorption emission

IT Energy transfer
IR luminescence
IR spectra
Luminescence
UV and visible spectra
(of erbium-**ytterbium**-codoped **potassium** yttrium **tungstate** crystal)

IT 18472-30-5, Erbium(3+), properties
RL: MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process); USES (Uses)
(absorption and emission spectra of **ytterbium**-codoped **potassium** yttrium **tungstate** crystal containing)

L42 ANSWER 10 OF 34 HCA COPYRIGHT 2005 ACS on STN

138:195307 Efficient tunable laser operation of diode-pumped Yb,Tm:KY(WO4)2 around 1.9 μm. Batay, L. E.; Demidovich, A. A.; Kuzmin, A. N.; Titov, A. N.; Mond, M.; Kueck, S. (Institute of Molecular and Atomic Physics, National Academy of Sciences of Belarus, Minsk, 220 072, Belarus). Applied Physics B: Lasers and Optics, 75(4-5), 457-461 (English) 2002. CODEN: APBOEM. ISSN: 0946-2171. Publisher: Springer-Verlag.

AB A new laser medium - Yb,Tm:KY(WO4)2 - for diode pumped solid state laser applications operating around 1.9 to 2.0 μm was studied and the main laser characteristics are presented. Diode pumping at 981 nm and around 805 nm was realized. For 981-nm pumping, the excitation occurs into Yb3+ ions followed by an energy transfer to Tm3+ions. A slope efficiency of 19% was realized. For pumping around 805 nm, the excitation occurs directly into the Tm3+ ions. Here a maximum slope efficiency of 52%, an optical efficiency of 40%, and output powers of >1 W were realized. Using a birefringent quartz plate as an intracavity tuning element, the tunability of the Yb,Tm:KY(WO4)2 laser in the spectral range of 1.85-2.0 μm was demonstrated. The possibility of laser operation in a microchip cavity configuration for this material also was shown.

CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

ST **ytterbium** thulium **potassium** yttrium **tungstate** near IR laser tunable; near IR spectra **ytterbium** thulium **potassium** yttrium **tungstate** laser; visible spectra **ytterbium** thulium **potassium** yttrium **tungstate** laser; energy transfer **ytterbium** thulium **potassium** yttrium **tungstate** laser

IT 7440-30-4, Thulium, properties 7440-64-4, Ytterbium, properties 18923-27-8, Ytterbium 3+, properties 22541-23-7, Thulium(3+), properties

RL: DEV (Device component use); MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process); USES (Uses)

(thulium- and **ytterbium**-doped **potassium** yttrium **tungstate**; efficient tunable laser operation of diode-pumped Yb,Tm:KY(WO4)2 around 1.9 μm)

IT 20596-83-2, Potassium yttrium tungstate (KY(WO4)2)

RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process); USES (Uses)

(thulium- and **ytterbium**-doped **potassium** yttrium **tungstate**; efficient tunable laser operation of diode-pumped Yb,Tm:KY(WO4)2 around 1.9 μm)

L42 ANSWER 11 OF 34 HCA COPYRIGHT 2005 ACS on STN

138:177792 Passively Q-switched diode-pumped 1.9 μm Yb,Tm:KYW laser. Kuzmin, A. N.; Nikeenko, N. K.; Demidovich, A. A.; Titov, A. N.; Mond, M.; Kueck, S.; Kisel, V. E.; Kuleshov, N. V. (Stepanov Institute of Physics, National Academy of Sciences of Belarus, Minsk, 220072, Belarus). Trends in Optics and Photonics, 68(Advanced Solid-State Lasers), 575-577 (English) 2002. CODEN: TOPRBS. Publisher: Optical Society of America.

AB Passively Q-switched operation of a Yb:Tm:KYW laser diode-pumped at 980 and 806 nm was studied. A thin plate of Cr:ZnSe was used as a saturable absorber for passive Q-switching. Maximum average output power of 32 mW at 1.9 μm in comparison to 208 mW for continuous wave regime of operation at the same pumping level was obtained.

CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related

Properties)
ST diode pumped thulium **ytterbium potassium** yttrium
tungstate IR laser
IT IR lasers
(thulium-**ytterbium**-doped **potassium** yttrium
tungstate passively Q-switched diode-pumped)
IT 7440-30-4, Thulium, uses
RL: DEV (Device component use); MOA (Modifier or additive use); USES
(Uses)
(-**ytterbium**-doped **potassium** yttrium
tungstate passively Q-switched diode-pumped IR laser)

L42 ANSWER 12 OF 34 HCA COPYRIGHT 2005 ACS on STN
138:177777 Yb:KYW microchip laser performance: fundamental frequency generation and Raman self-frequency conversion. Grabtchikov, A. S.; Kuzmin, A. N.; Lisinetskii, V. A.; Orlovich, V. A.; Demidovich, A. A.; Danailov, M. B.; Eichler, H. J.; Bednarkiewicz, A.; Strek, W.; Titov, A. N. (Institute of Physics, National Academy of Sciences of Belarus, Minsk, 220072, Belarus). Trends in Optics and Photonics, 68(Advanced Solid-State Lasers), 394-396 (English) 2002. CODEN: TOPRBS. Publisher: Optical Society of America.
AB Diode pumped Yb:KYW microchip laser in passively Q-switched and continuous-wave regimes is demonstrated. A slope efficiency of 23% was achieved for continuous-wave operation. Raman self-frequency conversion for the microchip configuration was obtained.
CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
ST **ytterbium potassium** tungsten **tungstate**
laser microchip Raman frequency conversion

L42 ANSWER 13 OF 34 HCA COPYRIGHT 2005 ACS on STN
138:63432 Sensitivity and stability of a radiation-balanced laser system. Bowman, Steven R.; Jenkins, Neil W.; O'Connor, Shawn P.; Feldman, Barry J. (Photonics Technology Branch, U.S. Naval Research Lab, Washington, DC, 20375, USA). IEEE Journal of Quantum Electronics, 38(10), 1339-1348 (English) 2002. CODEN: IEJQA7. ISSN: 0018-9197. Publisher: Institute of Electrical and Electronics Engineers.
AB It was previously shown that it is theor. possible to build a solid-state laser that generates no internal heat. This is accomplished through a detailed balance of the stimulated and spontaneous emission. Such a device is called a radiation-balanced laser. Here, the authors analyze laser operation when conditions deviate from perfect balance. Sensitivity and stability analyzes are presented for perturbations in the field parameters and temperature The radiation balance is a stable equilibrium under both transient and steady-state perturbations. Limits are derived on the magnitude of allowable spatial perturbations, and techniques for spatial mode matching are discussed. Numerical simulations of 1-μm laser operation of **Yb**-doped **K** Gd **tungstate**
are provided as an example.
CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

ST laser solid state sensitivity radiation balanced system heating;
ytterbium potassium gadolinium **tungstate**
laser radiation balanced sensitivity stability; near IR fluorescence
ytterbium potassium gadolinium **tungstate**
laser

IT 7440-64-4, Ytterbium, properties
RL: DEV (Device component use); MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(**ytterbium**-doped gadolinium **potassium tungstate**; sensitivity and stability of radiation-balanced laser system with)

IT 22723-67-7, Gadolinium potassium tungstate gdk(**wo4**)2
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(**ytterbium**-doped gadolinium **potassium tungstate**; sensitivity and stability of radiation-balanced laser system with)

L42 ANSWER 14 OF 34 HCA COPYRIGHT 2005 ACS on STN

137:239353 240-fs pulses with 22-W average power from a mode-locked thin-disk Yb:KY(WO4)2 laser. Brunner, F.; Sudmeyer, T.; Innerhofer, E.; Morier-Genoud, F.; Paschotta, R.; Kisel, V. E.; Shcherbitsky, V. G.; Kuleshov, N. V.; Gao, J.; Contag, K.; Giesen, A.; Keller, U. (Physics Department/Institute of Quantum Electronics, Swiss Federal Institute of Technology (ETH), ETH Zurich Honggerberg-HPT, Zurich, CH-8093, Switz.). Optics Letters, 27(13), 1162-1164 (English) 2002. CODEN: OPLEDP. ISSN: 0146-9592. Publisher: Optical Society of America.

AB We demonstrate what is to our knowledge the first passively mode-locked thin-disk Yb:KY(WO4)2 laser. The laser produces pulses of 240-fs duration with an average power of 22 W at a center wavelength of 1028 nm. At a pulse repetition rate of 25 MHz, the pulse energy is 0.9 μJ, and the peak power is as high as 3.3 MW. The beam quality is very close to the diffraction limit, with M2 = 1.1.

CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

ST **ytterbium** doped **potassium** yttrium
tungstate laser IR femtosecond pulse

IT 7440-64-4, **Ytterbium,** uses
RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)
(**potassium** yttrium **tungstate** doped with; near-IR 240-fs pulses with 22-W average power from a mode-locked thin-disk Yb:KY(WO4)2 laser)

L42 ANSWER 15 OF 34 HCA COPYRIGHT 2005 ACS on STN

137:223708 Optical characterization of Yb,Tm:KYW crystal concerning laser application. Demidovich, A. A.; Kuzmin, A. N.; Nikeenko, N. K.; Titov, A. N.; Mond, M.; Kueck, S. (Institute of Molecular and Atomic Physics, National Academy of Sciences of Belarus, Minsk, 220072, Belarus). Journal of Alloys and Compounds, 341(1-2), 124-129 (English) 2002. CODEN: JALCEU. ISSN: 0925-8388. Publisher: Elsevier Science B.V..

AB Absorption and emission spectra as well as 2F5/2(Yb3+) and

3H4,3F4(Tm3+) excited state relaxation of **Yb**:Tm-doped
K Y **tungstate** (KY(WO4)2) crystal were measured.
The intensities of the electronic transitions were analyzed from the point of view of further application of this crystal for diode pumped solid-state lasers. The processes of energy transfer between Yb and Tm ions under 980-nm excitation in this medium are discussed.

CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

ST thulium **ytterbium potassium** yttrium **tungstate** optical property laser application; near IR spectra thulium **ytterbium potassium** yttrium **tungstate** laser; visible spectra thulium **ytterbium potassium** yttrium **tungstate** laser; electronic state energy transfer thulium **ytterbium potassium** yttrium **tungstate**; decay luminescence thulium **ytterbium potassium** yttrium **tungstate**

IT IR spectra
(near-IR; optical characterization of **Yb**,Tm: **potassium** yttrium **tungstate** crystal concerning laser application)

IT Electronic energy transfer
Electronic state
Fluorescence decay
Solid state lasers
UV and visible spectra
(optical characterization of **Yb**,Tm:**potassium** yttrium **tungstate** crystal concerning laser application)

IT 7440-30-4, Thulium, properties 7440-64-4, Ytterbium, properties 18923-27-8, Ytterbium(3+), properties 22541-23-7, Thulium(3+), properties
RL: MOA (Modifier or additive use); PRP (Properties); USES (Uses)
(thulium- and **ytterbium**-doped **potassium** yttrium **tungstate**; optical characterization of **Yb**,Tm:**potassium** yttrium **tungstate** crystal concerning laser application)

IT 20596-83-2, Potassium yttrium tungstate (KY(WO4)2)
RL: PRP (Properties)
(thulium- and **ytterbium**-doped **potassium** yttrium **tungstate**; optical characterization of **Yb**,Tm:**potassium** yttrium **tungstate** crystal concerning laser application)

L42 ANSWER 16 OF 34 HCA COPYRIGHT 2005 ACS on STN

137:70141 Directly diode-pumped Yb:KY(WO4)2 regenerative amplifiers. Liu, Hsiao-hua; Nees, John; Mourou, Gerard (Center for Ultrafast Optical Science, University of Michigan, Ann Arbor, MI, 48109-2099, USA). Optics Letters, 27(9), 722-724 (English) 2002. CODEN: OPLEDP. ISSN: 0146-9592. Publisher: Optical Society of America.

AB Two Yb3+-doped KY(WO4)2 regenerative amplifiers, one end pumped by two 1.6 W single-stripe diodes at 940 nm and the other side pumped by one 20 W diode bar at 980 nm, are demonstrated. When the regenerative amplifiers are injected, 40 μJ, 400 fs and 65 μJ, 460 fs pulses at a 1 kHz repetition rate were obtained following

compression from the end- and side-pumped amplifiers, resp.
CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
ST **ytterbium potassium** yttrium **tungstate** solid state laser; near IR laser optical pumping

L42 ANSWER 17 OF 34 HCA COPYRIGHT 2005 ACS on STN
136:392880 Yb:KGd(WO4)2 chirped-pulse regenerative amplifiers. Liu, H.; Nees, J.; Mourou, G.; Biswal, S.; Spuhler, G. J.; Keller, U.; Kuleshov, N. V. (Center for Ultrafast Optical Science, University of Michigan, Ann Arbor, MI, 48109-2099, USA). Optics Communications, 203(3-6), 315-321 (English) 2002. CODEN: OPCOB8. ISSN: 0030-4018. Publisher: Elsevier Science B.V..
AB Two Yb3+-doped KGd(WO4)2 chirped-pulse regenerative amplifiers, one under direct diode pumping and the other under pulsed Ti:sapphire laser pumping, are demonstrated. A slope efficiency ≤43% is achieved from the free-running bare cavity of the diode-pumped amplifier, and 72% from that of the Ti:sapphire-pumped. When injected, the diode-pumped amplifier produces 44 μJ, 390 fs pulses at 1 kHz, and the Ti:sapphire-pumped amplifier produces 16 mJ, 1 ps pulses at 1 Hz, following compression.
CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
ST **ytterbium** doped **potassium** gadolinium **tungstate** chirped pulse amplifier laser

L42 ANSWER 18 OF 34 HCA COPYRIGHT 2005 ACS on STN
136:286143 Passively mode-locked Yb:KYW laser pumped by a tapered diode laser. Klopp, P.; Petrov, V.; Griebner, U. (Max-Born-Institut, Berlin, D-12489, Germany). Optics Express [online computer file], 10(2), 108-113 (English) 2002. CODEN: OPEXFF. ISSN: 1094-4087. URL: http://www.opticsexpress.org/view_file.cfm?doc=%23%29%5CK%2D%0A&id=%24%28%2C%27%26IP%2D%20%0A Publisher: Optical Society of America.
AB The authors demonstrate the operation of a low threshold femtosecond Yb:KYW laser, using a saturable absorber mirror for passive mode-locking and a high brightness laser diode as pumping source. Fourier-limited pulses with a duration of 101 fs are achieved at an output power of ≈100 mW. The performance of the Yb:KYW laser was also compared to that of Yb:KGW and Yb:glass in the same setup.
CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
ST **ytterbium** laser **potassium** yttrium **tungstate**; gadolinium **potassium tungstate** **ytterbium** laser; glass ytterbium laser; near IR spectra **ytterbium potassium tungstate** gadolinium yttrium glass; luminescence near IR **ytterbium** **potassium tungstate** gadolinium yttrium glass

L42 ANSWER 19 OF 34 HCA COPYRIGHT 2005 ACS on STN
136:93081 Diode-pumped Kerr-lens mode-locked Yb:KY(WO4)2 laser. Liu, H.; Nees, J.; Mourou, G. (Center for Ultrafast Optical Science,

University of Michigan, Ann Arbor, MI, 48109-2099, USA). Optics Letters, 26(21), 1723-1725 (English) 2001. CODEN: OPLEDP. ISSN: 0146-9592. Publisher: Optical Society of America.

AB A self-starting Kerr-lens mode-locked Yb:KY(WO4)2 laser directly end pumped by 2 1.6-W diodes is demonstrated for what is to knowledge the 1st time. Pulses as short as 71 fs with 120-mW average output power, at a center wavelength of 1057 nm, were obtained at a repetition rate of 110 MHz. A 10-nm tuning range was achieved with longer pulses and higher average output power.

CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

ST Kerr lens **potassium ytterbium tungstate** laser

L42 ANSWER 20 OF 34 HCA COPYRIGHT 2005 ACS on STN

136:61091 Thin disk laser operation and spectroscopic characterization of Yb-doped sesquioxides and potassium tungstates. Larionov, M.; Gao, J.; Erhard, S.; Giesen, A.; Contag, K.; Peters, V.; Mix, E.; Fornasiero, L.; Petermann, K.; Huber, G.; Der Au, J. Aus; Spuhler, G. J.; Brunner, F.; Paschotta, R.; Keller, U.; Lagatsky, A. A.; Abdolvand, A.; Kuleshov, N. V. (Institut fur Strahlwerkzeuge, Universitat Stuttgart, Stuttgart, 70569, Germany). Trends in Optics and Photonics, 50(Advanced Solid-State Lasers), 625-631 (English) 2001. CODEN: TOPRBS. Publisher: Optical Society of America.

AB Yb:Sc2O3 and Yb:Lu2O3 crystals were grown and analyzed spectroscopically. In the thin disk laser configuration continuous-wave operation with 61% slope efficiency and a maximum output power of 18.3 W could be demonstrated with Yb:Sc2O3. **Yb**-doped **K tungstates** were also operated in a high power continuous-wave thin disk laser. 73 W of output power with >60% optical efficiency and 73% slope efficiency was achieved using Yb:KYW.

CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

ST disk laser **ytterbium** doped **potassium tungstate** scandium lutetium oxide

L42 ANSWER 21 OF 34 HCA COPYRIGHT 2005 ACS on STN

135:217870 Spectroscopy and kinetics of the population of monoclinic KYb0.5Y0.43Tm0.07(WO4)2 crystals pumped by a pulsed Nd:YAG laser. Vatnik, S. M.; Maiorov, A. P.; Pavlyuk, A. A.; Plakushchev, D. V. (Institute of Laser Physics, Siberian Division, Russian Academy of Sciences, Novosibirsk, 630090, Russia). Quantum Electronics, 31(1), 19-22 (English) 2001. CODEN: QUELEZ. ISSN: 1063-7818. Publisher: Turpion Ltd..

AB The kinetics of pump radiation absorption and luminescence of monoclinic crystals of **K-Y-Yb tungstate** doped with Tm are studied. It is shown theor. and exptl. that due to the excitation multiplication caused by absorption of pump radiation from metastable states of Tm ions accompanied by cross-relaxation, >50% of a total number of Tm ions can occupy the 3F4 level. The cross sections for stimulated transitions in the spectral region from 1600 to 2100 nm are calculated from luminescence

spectra, and the gain in the crystal is estimated The prospects of practical applications of the results obtained in the paper are discussed.

CC 73-5 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

ST **potassium** thulium **ytterbium** yttrium **tungstate** radiation absorption luminescence kinetics

IT Physical process kinetics
(kinetics of population of monoclinic **potassium** thulium **ytterbium** yttrium **tungstate** crystals studied by using luminescence)

IT Energy level
(of potassium and thulium in relation to kinetics of population of **potassium** thulium **ytterbium** yttrium **tungstate**)

IT Fluorescence decay
(of thulium in **potassium** thulium **ytterbium** yttrium **tungstate**)

IT Optical absorption
(radiation absorption and luminescence kinetics of **potassium** thulium **ytterbium** yttrium **tungstate** crystals)

IT 357642-04-7
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
(kinetics of population of monoclinic **potassium** thulium **ytterbium** yttrium **tungstate** crystals studied by using luminescence)

L42 ANSWER 22 OF 34 HCA COPYRIGHT 2005 ACS on STN

134:48829 Diode-pumped passively Q-switched Yb:KGW laser. Lagatsky, A. A.; Abdolvand, A.; Kuleshov, N. V. (International Laser Center, Belarus State Polytechnical Academy, Minsk, 220027, Belarus). OSA Trends in Optics and Photonics Series, 34(Advanced Solid State Lasers), 116-120 (English) 2000. CODEN: OTOPFZ. ISSN: 1094-5695. Publisher: Optical Society of America.

AB The realization of diode-pumped passively Q-switched Yb:KGd(WO4)2 (KGW) laser with Cr4+:YAG saturable absorber was reported. Raman conversion of the fundamental laser emission in the Yb:KGW laser crystal was demonstrated. Q-switched 3.4 μJ pulses with a pulse width of 85 ns were obtained at 1033 nm fundamental wavelength and 0.4 μJ pulses with a pulse width of 20 ns were produced in a 1st Stokes at 1139 nm.

CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

ST **ytterbium** gadolinium **potassium** **tungstate** laser chromium YAG saturable absorber

IT Saturable absorbers
(diode-pumped passively Q-switched **ytterbium**-doped gadolinium **potassium** **tungstate** diode-pumped passively Q-switched laser with chromium-doped YAG)

IT Lasers
(**ytterbium**-doped gadolinium **potassium**

tungstate diode-pumped passively Q-switched)
IT 12005-21-9, YAG
RL: DEV (Device component use); USES (Uses)
(diode-pumped passively Q-switched **ytterbium**-doped gadolinium **potassium tungstate** diode-pumped passively Q-switched laser with saturable absorber of chromium-doped)
IT 15723-28-1, Chromium(4+), uses
RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)
(**ytterbium**-doped gadolinium **potassium tungstate** diode-pumped passively Q-switched laser with saturable absorber of YAG doped with)

L42 ANSWER 23 OF 34 HCA COPYRIGHT 2005 ACS on STN
133:342131 Diode-pumped femtosecond Yb:KGd(WO4)2 laser with 1.1-W average power. Brunner, F.; Spuhler, G. J.; Aus der Au, J.; Krainer, L.; Morier-Genoud, F.; Paschotta, R.; Lichtenstein, N.; Weiss, S.; Harder, C.; Lagatsky, A. A.; Abdolvand, A.; Kuleshov, N. V.; Keller, U. (Ultrafast Laser Physics, Institute of Quantum Electronics, Swiss Federal Institute of Technology, ETH Honggerberg HPT, Zurich, 8093, Switz.). Optics Letters, 25(15), 1119-1121 (English) 2000. CODEN: OPLEDP. ISSN: 0146-9592. Publisher: Optical Society of America.
AB The authors demonstrate a passive mode-locked Yb:KGd(WO4)2 laser. Using a semiconductor saturable-absorber mirror for passive mode locking, the authors obtain pulses of 176-fs duration with an average power of 1.1 W and a peak power of 64 kW at a center wavelength of 1037 nm. The authors achieve pulses as short as 112 fs at a lower output power. The laser is based on a standard delta cavity and pumped by 2 high-brightness laser diodes, making the whole system very simple and compact. Tuning the laser by a knife-edge results in mode-locked pulses within a wavelength range from 1032 to 1054 nm. In continuous-wave operation, the authors achieve output powers ≤1.3 W.
CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
ST mode lock **ytterbium** doped gadolinium **potassium tungstate** laser
IT Solid state lasers
(diode-pumped femtosecond **ytterbium** doped gadolinium **potassium tungstate** laser)
IT 22723-67-7, Gadolinium potassium tungstate (GdK(WO4)2)
RL: DEV (Device component use); USES (Uses)
(diode-pumped femtosecond **ytterbium** doped gadolinium **potassium tungstate** laser)
IT 7440-64-4, Ytterbium, uses
RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)
(diode-pumped femtosecond **ytterbium** doped gadolinium **potassium tungstate** laser)

L42 ANSWER 24 OF 34 HCA COPYRIGHT 2005 ACS on STN

133:24314 Passive Q switching and self-frequency Raman conversion in a diode-pumped Yb:KGd(WO4)2 laser. Lagatsky, A. A.; Abdolvand, A.; Kuleshov, N. V. (International Laser Center, Belarus State Polytechnical Academy, Minsk, 220027, Belarus). Optics Letters, 25(9), 616-618 (English) 2000. CODEN: OPLEDP. ISSN: 0146-9592. Publisher: Optical Society of America.

AB The authors report on the laser performance of a diode-pumped Yb:KGd(WO4)2 laser that is passively Q switched with a Cr4+:YAG saturable absorber. Raman conversion of fundamental laser emission in the laser crystal was demonstrated. Q-switched 3.4-μJ pulses with a pulse width of 85 ns were obtained at the 1033-nm fundamental wavelength and 0.4-μJ pulses with a pulse width of 20 ns were produced in a 1st Stokes at 1139 nm.

CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

ST **ytterbium** doped gadolinium **potassium** **tungstate** laser

L42 ANSWER 25 OF 34 HCA COPYRIGHT 2005 ACS on STN

132:300201 Efficient up-conversion in KYb0.8Eu0.2(WO4)2 crystal. Strek, W.; Deren, P. J.; Bednarkiewicz, A.; Kalisky, Y.; Boulanger, P. (Institute for Low Temperature and Structure Research, Polish Academy of Sciences, Wroclaw, 50442, Pol.). Journal of Alloys and Compounds, 300-301, 180-183 (English) 2000. CODEN: JALCEU. ISSN: 0925-8388. Publisher: Elsevier Science S.A..

AB Efficient visible anti-Stokes emission was observed in the KEu0.2Yb0.8(WO4)2 crystal after a direct excitation of the Yb3+ ion. This emission is associated with the Eu3+ ion and originates not only from the 5D0 state but also from the 5D2 and 5D1 states. The process of up-conversion was studied at 300 K as a function of excitation power. The process was nonlinear and changed with the incident power as Pexcn, n = 1.5. The mechanism of up-conversion processes occurring in the KEu0.2Yb0.8(WO4)2 crystal is briefly discussed.

CC 73-2 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

ST europium **potassium ytterbium tungstate** up conversion

L42 ANSWER 26 OF 34 HCA COPYRIGHT 2005 ACS on STN

132:243598 Diode-pumped CW Yb:KGW and Yb:KYW minilasers. Lagatsky, A. A.; Kuleshov, N. V.; Mikhailov, V. P. (International Laser Center, Belarus State Polytechnical Academy, Minsk, 220027, Belarus). OSA Trends in Optics and Photonics Series, 26(Advanced Solid-State Lasers), 291-294 (English) 1999. CODEN: OTOPFZ. ISSN: 1094-5695. Publisher: Optical Society of America.

AB Room temperature cw laser action of Yb3+-doped KY(WO4)2 and KGd(WO4)2 crystals at 1026-1044 nm was demonstrated under pumping by 980 nm fiber-coupled InGaAs laser diode. A slope efficiency of Yb lasers ≤53% was obtained.

CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

ST **ytterbium potassium** gadolinium **tungstate**

diode pumped IR laser; yttrium **potassium tungstate**
ytterbium diode pumped IR laser

L42 ANSWER 27 OF 34 HCA COPYRIGHT 2005 ACS on STN
132:243541 Influence of Yb concentration on Yb:KYW laser properties.
Demidovich, A. A.; Kuzmin, A. N.; Ryabtsev, G. I.; Danailov, M. B.;
Strek, W.; Titov, A. N. (F. Skaryna Ave.70, Institute of Molecular
and Atomic Physics, National Academy of Sciences of Belarus, Minsk,
220072, Belarus). Journal of Alloys and Compounds, 300-301, 238-241
(English) 2000. CODEN: JALCEU. ISSN: 0925-8388. Publisher:
Elsevier Science S.A..
AB Continuous-wave and Q-switched KY(WO4)2:Yb3+ with Yb concentration of 5%,
10%, and 20% laser operation under LD pumped were studied and the
main characteristics of the KY(WO4)2:Yb3+ laser are presented here.
A maximum slope efficiency of 66% was achieved for this active medium.
CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related
Properties)
ST **potassium** yttrium **tungstate ytterbium**
concn laser

L42 ANSWER 28 OF 34 HCA COPYRIGHT 2005 ACS on STN
132:200720 Z-scan measurements of nonlinear refraction and Kerr-lens
mode-locking with Yb3+:KY(WO4)2. Yumashev, K. V.; Posnov, N. N.;
Prokoshin, P. V.; Kalashnikov, V. L.; Mejid, F.; Poloyko, I. G.;
Mikhailov, V. P.; Kozich, V. P. (International Laser Center,
Belorussian State Polytechnical Academy, Minsk, 220027, Belarus).
Optical and Quantum Electronics, 32(1), 43-48 (English) 2000.
CODEN: OQELDI. ISSN: 0306-8919. Publisher: Kluwer Academic
Publishers.
AB The nonlinear refractive index n2 of Yb3+:KY(WO4)2 crystal was
measured using pico-second Z-scan technique. The magnitude of n2 is
8.7 + 10-16 cm2/W at wavelength of 1.08 μm. The numerical
modeling based on fluctuation model showed a great potential of this
crystal as active medium for Kerr-lens mode-locking.
CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related
Properties)
ST Z scan nonlinear refraction Kerr lens mode locking; KY
ytterbium doped **potassium** yttrium
tungstate

L42 ANSWER 29 OF 34 HCA COPYRIGHT 2005 ACS on STN
131:163064 Diode-pumped CW lasing of Yb:KYW and Yb:KGW. Lagatsky, A.
A.; Kuleshov, N. V.; Mikhailov, V. P. (F. Scoryna ave. 65,
International Laser Center, Belarus State Polytechnical Academy,
Minsk, Belarus). Optics Communications, 165(1,2,3), 71-75 (English)
1999. CODEN: OPCOB8. ISSN: 0030-4018. Publisher: Elsevier Science
B.V..
AB Room temperature continuous-wave laser action of Yb3+-doped KY(WO4)2 and
KGd(WO4)2 crystals at 1026-1044 nm was demonstrated under pumping by
980 nm fiber-coupled InGaAs laser diode. A slope efficiency of Yb
lasers up to 53% was obtained.
CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related
Properties)

ST near IR laser **ytterbium potassium tungstate** gadolinium yttrium
IT Solid state lasers
(diode-pumped continuous-wave near-IR lasing of **ytterbium** -doped **potassium** yttrium **tungstate** or gadolinium potassium tungstate)
IT IR lasers
(near-IR; diode-pumped continuous-wave near-IR lasing of **ytterbium**-doped **potassium** yttrium **tungstate** or gadolinium potassium tungstate)
IT 7440-64-4, Ytterbium, properties 18923-27-8, Ytterbium(3+), properties
RL: DEV (Device component use); MOA (Modifier or additive use); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process); USES (Uses)
(diode-pumped continuous-wave near-IR lasing of **ytterbium** -doped **potassium** yttrium **tungstate** or gadolinium potassium tungstate)
IT 20596-83-2, Potassium yttrium tungstate (KY(WO4)2) 22723-67-7, Gadolinium potassium tungstate (GdK(WO4)2)
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process); USES (Uses)
(diode-pumped continuous-wave near-IR lasing of **ytterbium** -doped **potassium** yttrium **tungstate** or gadolinium potassium tungstate)

L42 ANSWER 30 OF 34 HCA COPYRIGHT 2005 ACS on STN
131:151209 Kerr lens mode-locked operation of a Yb:KYW laser.
Kalashnikov, Vladimir L.; Mejid, F.; Poloyko, Igor G.; Mikhailov, Victor P. (International Laser Ctr., Minsk, Belarus). Proceedings of SPIE-The International Society for Optical Engineering, 3613(Solid State Lasers VIII), 289-291 (English) 1999. CODEN: PSISDG. ISSN: 0277-786X. Publisher: SPIE-The International Society for Optical Engineering.
AB Using a modified ABCD-matrix approach accounting for nonlinear refraction in active medium, the authors determined the ranges of cavity parameters that provide a mode-locking of Yb:KYW-laser in usual z-fold cavity configuration. Taking the cavity parameters that provide a most efficient mode locking and based on fluctuation model, the authors performed a numerical simulation of laser operation. The authors used for calcns. the side-band pump power of 6 W at 982 nm with 1 cm X 50 μm beam cross section in active medium and the length of 1 cm for KYW crystal. Calcns. showed that self-starting operation is possible with these parameters and dispersion compensation allows for bandwidth-limited ultrashort pulse generation. The shortest pulse duration is .apprx.200 fs with self-starting build-up time of 130 μs(s). Such a built-up time is comparable and even shorter than that 1 for the lasers with semiconductor saturable absorbers. The region of neg. dispersion provided by prism pair where a stable ultrashort pulse generation takes place is (-17000 - -42000) fs2.
CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

ST kerr lens mode locking laser **ytterbium potassium** yttrium **tungstate**
IT Solid state lasers
(Kerr lens mode-locked operation of **ytterbium**-doped **potassium** yttrium **tungstate** laser)
IT Lenses
(Kerr; Kerr lens mode-locked operation of **ytterbium** -doped **potassium** yttrium **tungstate** laser)
IT Kerr effect (electrooptical)
(lens; Kerr lens mode-locked operation of **ytterbium** -doped **potassium** yttrium **tungstate** laser)
IT 20596-83-2, Potassium yttrium tungstate ky(wo4)2
RL: DEV (Device component use); USES (Uses)
(Kerr lens mode-locked operation of **ytterbium**-doped **potassium** yttrium **tungstate** laser)
IT 7440-64-4, Ytterbium, uses
RL: DEV (Device component use); MOA (Modifier or additive use); USES (Uses)
(Kerr lens mode-locked operation of **ytterbium**-doped **potassium** yttrium **tungstate** laser)

L42 ANSWER 31 OF 34 HCA COPYRIGHT 2005 ACS on STN
127:300883 Pulsed laser operation of Yb-doped KY(WO4)2 and KGd(WO4)2.
Kuleshov, N. V.; Lagatsky, A. A.; Podlipensky, A. V.; Mikhailov, V. P.; Huber, G. (International Laser Cent., Belarus State Polytechnical Acad., Minsk, 220027, Belarus). Optics Letters, 22(17), 1317-1319 (English) 1997. CODEN: OPLEDP. ISSN: 0146-9592. Publisher: Optical Society of America.
AB Spectroscopic properties and laser performance of Yb-doped tungstates at pulsed Ti:sapphire laser pumping are reported. Room-temperature lasing near 1025 nm is demonstrated in Yb:KY(WO4)2 and Yb:KGd(WO4)2, with a slope efficiency ≤86.9%.
CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
ST laser **ytterbium potassium** gadolinium yttrium **tungstate**

L42 ANSWER 32 OF 34 HCA COPYRIGHT 2005 ACS on STN
126:299407 CW laser performance of Yb and Er, Yb doped tungstates.
Kuleshov, N. V.; Lagatsky, A. A.; Shcherbitsky, V. G.; Mikhailov, V. P.; Heumann, E.; Jensen, T.; Diening, A.; Huber, G. (International Laser Center, Belarus State Polytechnical Academy, Minsk, 220027, Belarus). Applied Physics B: Lasers and Optics, B64(4), 409-413 (English) 1997. CODEN: APBOEM. ISSN: 0946-2171. Publisher: Springer.
AB Room temperature cw laser action of Yb3+-doped KY(WO4)2 and KGd(WO4)2 crystals at 1.025 μm and Er,Yb:KY(WO4)2 at 1.54 μm was demonstrated under pumping by both Ti-sapphire laser and InGaAs laser diodes. A slope efficiency of Yb lasers ≤78% was obtained.
CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)
ST laser performance **potassium** gadolinium **tungstate**

ytterbium; yttrium **potassium** **tungstate**
ytterbium laser performance; erbium ytterbium doped
tungstate laser performance

L42 ANSWER 33 OF 34 HCA COPYRIGHT 2005 ACS on STN
125:127085 The new manifestation of nonlinear optical interactions in the KY(WO4)2 and KGd(WO4)2 laser crystals. Kaminskii, A. A.; Nishioka, Kh.; Kubota, Yu.; Ueda, K.; Takuma, Kh.; Bagaev, S. N.; Pavkyuk, A. A. (Shubnikov, A. V., Institut Kristallografii, Moscow, Russia). Doklady Akademii Nauk, 346(1), 33-36 (Russian) 1996. CODEN: DAKNEQ. ISSN: 0869-5652. Publisher: MAIK Nauka.

AB In the KY(WO4)2 and KGd(WO4)2 monoclinic compds. at 300 K the low-threshold stimulated Raman scattering was excited. The effects of "laser rainbow" and self-channeling of collinear pumping radiation and Stokes component were revealed.

CC 73-10 (Optical, Electron, and Mass Spectroscopy and Other Related Properties)

ST laser crystal nonlinear optical property SRS; SRS spectra **potassium** **ytterbium** gadolinium **tungstate**

L42 ANSWER 34 OF 34 HCA COPYRIGHT 2005 ACS on STN
91:132927 Luminous substance coactivated with neodymium and ytterbium. Kashiwada, Yasutoshi; Suzuki, Atsushi; Morioka, Makoto; Tanimizu, Shinkichi (Hitachi, Ltd., Japan). Ger. Offen. DE 2903073 19790802, 39 pp. (German). CODEN: GWXXBX. APPLICATION: DE 1979-2903073 19790126.

AB A phosphor with a high IR-emission intensity consists of the formula Ln1-x-yNdxYbyZ, where Ln is Bi, Ce, Ga, Gd, In, La, Lu, Sb, Sc, or Y, Z = A5(MO4)4 or A3(PO4)2 where A is K or Na and M is W or Mo, or D3(BO3)4 where D is Al or Cr, or P5O14, Na2Mg2(VO4)3, or A1(MO4)2 where A' is Li, Na, or K, $0.01 \le x \le 0.99$, and $0.01 \le y \le 0.99$ with $x + y \le 1$. Thus, a powder of Na2CO3 0.5, Nd2O3 0.08, Yb2O3 0.02, and WO3 0.8 mol was mixed, pelletized, heated at 150°/h to 650° and held at 650° for 50 h, cooled, and crushed to give a phosphor of Nd0.8Yb0.2Na5(WO4)4 with an emission intensity of 115 compared to 100 for LiNd0.9Yb0.1P4O12.

IC C09K011-46; G06K007-12

CC 76-7 (Electric Phenomena)

IT 13775-57-0D, solid solns. with sodium ytterbium tungstate
22878-28-0D, solid solns. with sodium ytterbium molybdate
22878-32-6D, solid solns. with sodium neodymium molybdate
28876-79-1D, solid solns. with potassium ytterbium molybdate
29992-16-3D, solid solns. with neodymium potassium molybdate
33660-58-1D, solid solns. with sodium neodymium tungstate
58000-32-1D, solid solns. with **potassium** **ytterbium** **tungstate** 71384-21-9D, solid solns. with neodymium potassium tungstate
RL: USES (Uses)
(IR phosphor of)

=>